STATE OF WASHINGTON DEPARTMENT OF ECOLOGY HAZARDOUS WASTE INVESTIGATIONS AND CLEANUP PROGRAM

January 20, 1989

TO:

Bob Kievit, EPA WOO PA/SI PO

THROUGH:

Bob Goodman & 6

FROM:

Michael J. Spencer

SUBJECT:

Site Inspection Report Addendum Transmittal

Attached is a copy of an addendum to the Weyerhaeuser Chlor-Alkali Site Inspection Report from November 1986.

The lack of any significantly affected population causes this site to score low enough on preliminary HRS scoring of both the deeper, utilized aquifer and the shallow, contaminated aquifer that I an recommending no further action by PA/SI, with continued oversight by Ecology Industrial Section.

Copies of the two scoring sheets are also attached.

MJS:BG:rs Attachments

USEPA SF

Christine O. Gregoire

Director



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia. Washington 98504-8711 • (206) 459-6000

ADDENDUM

SITE INSPECTION REPORT

Weyerhaeuser Co. Chlor-Alkali Plant Longview, Cowlitz County, Washington

WAD009041450

January 1989

Washington State Department of Ecology Hazardous Waste Investigations and Cleanup Program Preliminary Assessment/Site Inspection Unit January 20, 1989

Addendum to Weyerhaeuser Chlor-Alkali, WAD009041450, Longview, Site Inspection Report

Michael J. Spencer

Introduction

The November 1986 SI report for this site recommended that Weyerhaeuser:

- i) Submit a plan and schedule of implementation for a series of not less than two shallow monitoring wells in the area west of the pulp mill effluent lines and east of the boat launch ramp halfway between the paved parking lot currently in use and the river, along with one upgradient well. These were to serve to monitor for any past or future lateral migration of mercurial species.
- ii) Make proper notification about appropriate safety concerns to be exercised during any excavations required in their future development of the west site property. A notation on the deed to the property should be recorded that will in perpetuity notify any potential purchaser that the documented levels of mercury contamination are present.
- iii) Obtain further quantification of the residual mercury contamination at the east site and the caustic storage ditch, with appropriate and timely consultation with Ecology regarding any sampling and hydrogeological studies.

As a follow-up to these recommendations, Weyerhaeuser has now completed the following:

In April 1987 they had contractors (Sweet-Edwards/EMCON, Inc., Kelso, WA) develop and submit to Ecology for review a work plan for the installation of one up and two downgradient monitoring wells on the west side of the site. An expanded assessment of residual mercury contamination on the site east side was also included, plus an implementation schedule for installations/sampling.

With respect to the second above recommendation, the work plan stated:

Construction Safety at the West Site - Any future construction plans which may involve the west site area will include additional safety procedures specific for the potential exposure to residual mercury in the surface soils in certain areas.

Property Deed Notation - A notation on the deed to the property will be recorded that will in perpetuity notify any potential purchaser

that the surface soils in certain areas of the west site contain elevated residual mercury concentrations.

Weyerhaeuser agreed to both the installation of one additional downgradient well as per my May 1987 review (Appendix B) and to a joint sampling event for collection of split samples from the east side area. The work plan was finalized in June 1987 (Appendix B), with wells installed the following month.

Soil samples were collected at two and one-half foot intervals during the well installations, with analyses made for total mercury and mercury EP Toxicity. Monitoring well samples were collected, beginning in early August 1987, through August 1988. Surface water samples were also collected from three locations adjacent to the Columbia River in September 1987 and May 1988. A surface water sample was collected from the marsh/wetland area at the extreme west edge of the property in May 1988. Water samples were submitted to Weyerhaeuser's laboratory for analysis for mercury, pH and specific conductance.

Soil samples were collected at varying depths at seven locations on the site east side on June 16, 1987. Following backhoe excavation, soil samples were collected from each visually different strata or at least three depths (usually two, five and ten feet). Bottom sediment samples at two locations along the storm water drainage ditch adjacent to the northeast corner of the former chlorine plant cell room building were also collected.

Seven sample splits were collected by Ecology at four locations as described in Table 1, as well as from the two ditch samples. A separate sample was collected from the bank of the Columbia River, just above the boat launching ramp.

Results and Discussion

The February 1988 status report by Sweet-Edwards (Appendix A) describes the installation of four monitoring wells and analytical results for the soil samples collected July 20-23, 1987 and water samples collected August 1987 - January 1988.

Mercury concentrations in the soils were above the detection limit (0.1 mg/kg) in 6 of the 34 samples collected. These samples were:

<u>Well</u>	Sample Depth	Concentration (mg/kg)
MW - 2	10-11.5 ft.	0.46
MW - 3	5-6.5 ft.	1.9
MW - 4	5-6.5 ft.	0.2
MW - 4	7.5-9 ft.	0.2
MW - 4	10-11.5 ft.	0.1
MW - 4	22.5-24 ft.	0.1

None of the soil samples had mercury concentrations which exceeded the $0.2\,\mathrm{mg/L}$ EP Toxicity limit.

These results correlate well with those presented earlier (Section 5) whereby on the west site the mercury concentration fell off sharply with depth, with the maximum value recorded being 16 mg/kg at the two-foot depth and the highest concentration at depths seven feet or greater (to 15 foot maximum) being 0.8 mg/kg. Detectable levels of extractable mercury were likewise not determined in the earlier EP Tox determinations.

Water samples from the monitoring wells were collected on four separate dates: August 5, September 3 and November 4, 1987, and January 12, 1988. The 0.002 mg/L Primary Drinking Water Maximum Contaminant Level (MCL) was exceeded in two of the monitoring wells. On August 5, 1987 and January 12, 1988, the mercury concentrations in well MW-3 were 0.004 and 0.003 mg/L, respectively. Mercury concentrations in samples from well MW-4 exceeded the MCL on each of the four sample dates. Concentrations ranged from 0.012 to 0.039 mg/L, 6 to nearly 20 times the MCL.

Four further monitoring well sampling events, as well as several surface water sample collections, occurred during the ensuing period ending August 5, 1988. A summary of these results, together with the earlier ones, is presented in the November 7, 1988 report by Sweet-Edwards/EMCON, Inc. (Appendix A). Again, mercury concentrations exceeded the MCL on all sample dates for MW-4, ranging from 0.0026 - 0.021 mg/l. During the eight-event monitoring period of August 1987 - August 1988, the upgradient monitoring well, MW-1, recorded a detectable mercury concentration only once, this being 0.0005 mg/l on January 12, 1988. Although this is only a quarter of the MCL, it does establish a significant contamination of downgradient ground water by mercury (significance here being defined as five or more times the background concentration, or three or more times the minimum level of detection).

On only one occasion (May 5, 1988) did a surface water sample (5-X) record a detectable mercury concentration (at a level of detection, 0.0002 mg/l).

Depth to ground water was also measured for the four monitoring wells during the one-year study period. It ranged from about eight to 15 feet below ground surface. The depths fluctuated seasonally approximately 2-2.5 feet, being lowest in late summer and highest in late winter. There was an apparent inverse relationship between water table elevations and measured mercury concentrations. During the period November 1987-August

1988 increases in water table elevation corresponded with decreases in ground water mercury concentrations, due likely to dilution and/or increased ground water flow rates resulting from increased incident precipitative recharge to the shallow ground water aquifer. The flow of this shallow ground water was shown to be southwest toward the Columbia River.

The results of the split samples taken from the east site showed a good comparison between Ecology Manchester Laboratory and Weyerhaeuser's laboratory, as shown in the following table:

East Site
Total Mercury Concentrations (mg/kg)

Location No.	Depth (feet)	Ecology <u>Analysis</u>	Weyerhaeuser <u>Analysis</u>
1	5	4.9	4.0
i	10	7.8	4.9 34
2	5	1.3	1.5
2	10	0.21	0.32
4	2	5.4	5.3
4	10	0.55	2.3
5	10	0.15	0.31
Upper ditch		4.1	15
Lower ditch		17	35
River bank		0.078	

The mercury concentrations again showed a decrease with increasing depth in most cases, except for location 1, where the highest recorded soil sample mercury concentration of 34 mg/kg was at the third depth sampled (10 feet), similar to earlier results in Section 5 where site E-5 had a concentration of 27 mg/kg, at the deepest depth able to be excavated (i.e., at bedrock, 5 feet in this case). Bedrock exists in the area at 5-10 feet depth.

It appears from a comparison of the analytical results that the mercury concentrations as measured by Weyerhaeuser were rather consistently higher in magnitude (seven out of 11 measurements) than Ecology's.

Final Conclusions and Recommendations

On-site soil and ground water sampling conducted by Weyerhaeuser during 1986-1988 has documented significant contamination of both by total mercury, relative to background concentrations. EP Tox determinations, however, have shown the mercury to be relatively immobilized, probably due to the presence of numerous clay layers with increasing depth. Although the ground water mercury concentrations often exceeded the MCL for

drinking water, there is no known use of this shallow water table aquifer for drinking water, or any other purposes.

Off-site migration of mercury was not detected in terms of fish tissue samples, river sediment samples or localized surface water samples.

The major source of drinking water for the Longview area is from a surface water reservoir several miles upstream on the Cowlitz River. Only a limited number of private domestic wells are found within a three mile radius, these drawing from the deeper regional aquifer rather than the shallow alluvial water table aquifer on-site (Appendix B).

The likelihood of surface water contamination (Columbia River) is drastically minimized by the apparent immobility of the mercury, constant dredging of the river offshore of the site and immense dilution effect of the river.

It is concluded that the on-site mercury contamination poses negligible risk to human health if the affected areas remain adequately covered and undisturbed. If the latter occurs, necessary precautions must be taken in terms of personal safety and concerns of any off-site disposal. Additional notification to the property deed need be made to cover the extensive surface mercury contamination of the east site area.

On the basis of the above, it is recommended that the PA/SI Unit pursue no further action at this site and that it be removed from the active CERCLIS list of potential hazardous waste sites. The continuing oversight of this site by Ecology Industrial Section should include periodic updates by Weyerhaeuser of monitoring well analyses for mercury.

TABLE 1

Ecology Sample No.	Weyerhaeuser Location No.	Depth (feet)	Notes
1	2	5	Ground water at five feet,
2	2	10	site is 80'N, 30'E of E-5
3	4	2	Did not hit ground water,
4	4	10	black organic/sandy.
5	5	10	Nearest to E-5.
6 7	1 1	5 10	In middle of former brine pond.
8 9 10	Upper ditch Lower ditch River bank	 	Near old cell room 300 ft. east. Just upriver from boat
			ramp.





Weyerhaeuser Paper Company

Longview, Washington 98632 (206) 425-2150

December 27, 1988

Michael Spencer Hazardous Waste Clean-up Program Washington Department of Ecology MS PV-11 Olympia, WA 98504

Dear Mr. Spencer:

Re: Chllor-Alkali Plant Mercury Investigation

Enclosed is a copy of the Sweet-Edwards/Emcon, Inc. Report entitled "Weyerhaeuser Paper Company, Chlorine Plant-Longview Mill Site, Soil and Ground Water Investigation".

As the title implies, this report summarizes data collected since the summer, 1987 to assess possible soil and ground water mercury contamination in the vicinity of our chlorine plant. You will recall this latest field study was in response to recommendations made by WDOE and EPA in your February 16, 1987 site investigation report. Weyerhaeuser responded to that report by proposing a study plan in April, 1987 which was reviewed and approved by you in May of that year. An interim report on these field studies was submitted to you on March 28, 1988.

We are available to meet with you to review the report. In the interim, we will continue to conduct groundwater monitoring on the same bi-monthly schedule.

Ken Johnson

Environmental Manager

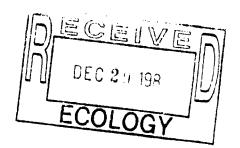
Ken Johnson / Up

KJ:vj D2-T1;KJv12-27-88 WEYERHAEUSER PAPER COMPANY

CHLORINE PLANT - LONGVIEW MILL SITE

SOIL AND GROUND WATER INVESTIGATION

November 7, 1988



SUBMITTED TO:

Weyerhaeuser Paper Company Longview Mill Site Longview, WA 98632

SUBMITTED BY:

Sweet-Edwards/EMCON, Inc. P.O. Drawer B Kelso, WA 98626

WEYCO-R.N07 TS S4101.02

Rev. 1, 11/07/88

WEYERHAEUSER PAPER COMPANY CHLORINE PLANT - LONGVIEW MILL SITE TABLE OF CONTENTS

	<u>Page 1</u>	<u> 10.</u>
1.0	EXECUTIVE SUMMARY	1
	1.2 WORK COMPLETED	1
	1.3 CONCLUSIONS	2
	1.3.1 <u>Soils</u>	2
	1.3.2 Ground Water	2
		2
2.0		3
	2.1 MONITORING WELL INSTALLATION	3
	2.2	4
	2.2.1 Ground Water Sampling	4
	2.2.2 <u>Surface Water Sampling</u>	5
	2.3 QUALITY ASSURANCE/QUALITY CONTROL	5
3.0		7
	3.1 GEOLOGY	7
	3.2 HYDROGEOLOGY	7
4.0	IADADAMADA MEGMINA DEGLIMO	_
4.0		9
	4.1 SOIL QUALITY RESULTS	9
	4.2 WATER QUALITY RESULTS	10
	TABLES	
	After Pq. N	O.
1.	Soil Sample Summary	3
2.		4
3.	Hydrology Data	8
4.	Soil Quality Data	9
5.	Water Quality Data	10
	FIGURES	
•	After Pg. N	0.
1.	Site Map	3
2.	Typical Monitoring Well Construction	3
3.	Typical Security Casing Construction	3
4.	Monitoring Well Hydrographs	8
5.	Monitoring Well 4 - Mercury Concentrations vs.	
	Water Table Elevations	11
	APPENDICES	
	(following text)	
	(Lottoning cond)	
Α.	Well Logs	
в.	Field Data Forms	
	Chain of Custody Forms	
c. D.	Laboratory Results	
	<u> </u>	

WEYERHAEUSER PAPER COMPANY CHLORINE PLANT - LONGVIEW MILL SITE SOIL AND GROUND WATER INVESTIGATION

1.0 EXECUTIVE SUMMARY

1.1 BACKGROUND AND PURPOSE

Previous investigations by Weyerhaeuser have shown that there are low concentrations of mercury in the shallow soils near the salt storage piles west of the chlorine plant. The purposes of this investigation were to: 1) further define the extent of mercury soil contamination, and 2) determine the extent of mercury ground water contamination, if present.

1.2 WORK COMPLETED

Field investigation activity began in the area west of the Weyerhaeuser Chlorine Plant in July 1987. Four monitoring wells were constructed and soil samples were collected at 2-1/2-foot intervals. Soil samples were analyzed for total and EP Toxicity mercury. Soil/sediment samples were collected from three locations adjacent to the Columbia River in September 1987 and analyzed for total mercury concentrations.

Water samples were collected from the four monitoring wells on eight occasions between August 1987 and August 1988. Surface water samples were collected from three locations adjacent to the Columbia River in September 1987 and May 1988. A surface water sample was collected from the marsh/wetland area at the extreme west edge of the property in May 1988. Water samples were submitted to the laboratory for analysis for mercury, pH and specific conductance.

1.3 CONCLUSIONS

1.3.1 <u>Soils</u>

- O Total mercury concentrations in soils were found to exceed the 0.1 mg/kg detection limit in three of the four monitoring well locations.
- o EP Toxicity mercury concentrations in soils were found to exceed the 0.0002 mg/L detection limit for one sample each from monitoring wells MW-1, MW-2 and MW-3, and two samples from MW-4.
- o Soil EP Toxicity mercury concentrations exceeding the detection limit were approximately 50 to 1,000 times less than the 0.2 mg/L EP Toxicity Standard.

1.3.2 Ground Water

- o Mercury concentrations in ground water exceeded the detection limit on at least one date for all monitoring wells and in every sample from monitoring well MW-4.
- Mercury concentrations exceeded the MCL on two dates for monitoring well MW-3 and all dates for monitoring well MW-4.
- o Water samples from surface water sampling sites were found to have mercury concentrations below the detection limit with the exception of the surface site S-X split sample sent to Weyerhaeuser Analytical Laboratory on May 9, 1988.

2.0 FIELD WORK

2.1 MONITORING WELL INSTALLATION

Four monitoring wells were installed at the locations on Figure 1. Monitoring wells MW-1, MW-2, and MW-3 were first installed to obtain ground water elevation data. The shallow ground water flow direction was calculated from this data and used to select a downgradient location for well MW-4.

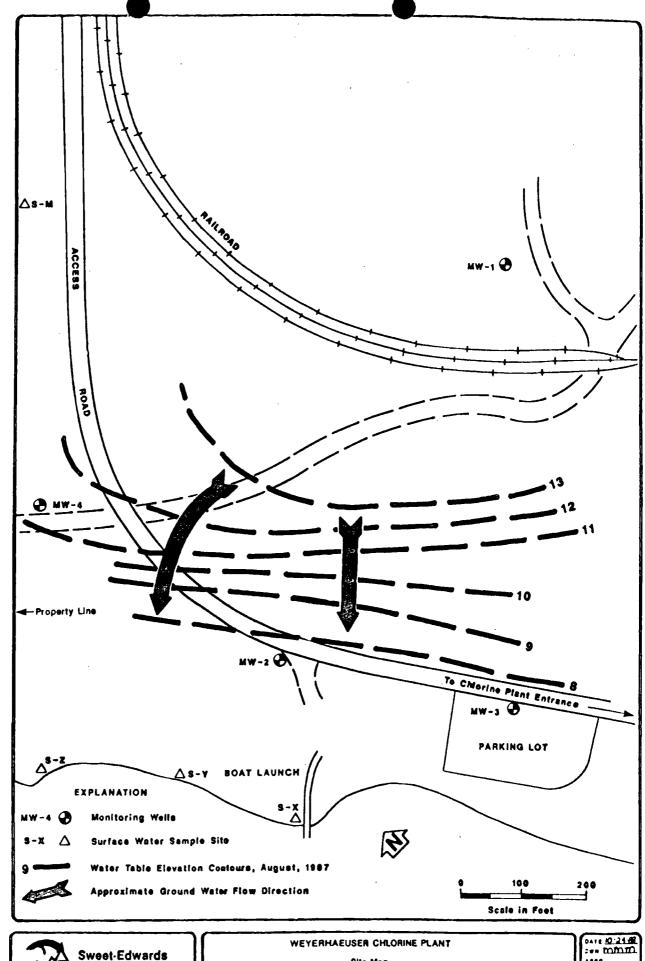
Wells were installed using a CME 75 drill rig with 6-inch I.D. hollow stem auger. Soil samples were taken every 2 1/2 feet to the maximum boring depth of 20 1/2 to 26 1/2 feet below ground surface (see well logs, Appendix A). The samples were later submitted for laboratory testing, as listed on Table 1.

Upon completion of the boring, monitoring wells were constructed with 2-inch diameter schedule 80 PVC screen and casing (Figure 2). The screened section consists of 15 feet of factory milled PVC with 0.010-inch slots. All joints are flush threaded to avoid water quality effects from the use of solvent cements. An annular filter pack of Aqua 8 Monterey sand was installed from the bottom of the borehole to approximately 1 to 2 feet above the top of the screen. The remaining annular space around each well was filled with bentonite chips which provide an annular seal. A locked steel security casing set in a shallow concrete pad was installed over each monitoring well (see Figure 3).

Following installation, the monitoring well screens were developed by bailing and pumping to remove fine sediments and maximize hydraulic connection between the annular sand pack and the formation. Screen development continued until discharge water was essentially sediment free.

TABLE 1
SOIL SAMPLE SUMMARY

LOCATION	SAMPLE	SAMPLE
DESIGNATION	DATE(S)	DEPTH (ft.
MW-1	7-20-87	2.5-4
	7-20-87	2.5-4 5-6.5
	7-20-87	7.5 - 9
	7-20-87	10-11.5
	7-20-87	12.5-14
	7-20-87	15-16.5
	7-20-87	17.5-19
	7-20-87	20-21.5
MW-2	7-21-87	• • •
_	7-21-87	2.5-4
	7-21-87	5-6.5
	7-21-87	7.5-9
	7-21-87	10-11.5
	7-21-87	12.5-14
	7-21-87	15-16.5
	7-21-87	17.5-19 20-21.5
_	. 22 07	20-21.5
MW-3	7-21-87	2.5-4
	7-21-87	5-6.5
	7-21-87	7.5-9
	7-21-87	10-11.5
	7-21-87	12.5-14
	7-21-87	15-16.5
	7-21-87	17.5-19
	7-21-87	20-21.5
MW-4	7-23-87	2.5-4
	7-23-87	2.5-4 5-6.5
	7-23-87	7.5-9
	7-23-87	10-11.5
	7-23-87	12.5-14
	7-23-87	15-16.5
	7-23-87	17.5-19
	7-23-87	20-21.5
	7-23-87	22.5-24
	7-23-87	25-26.5

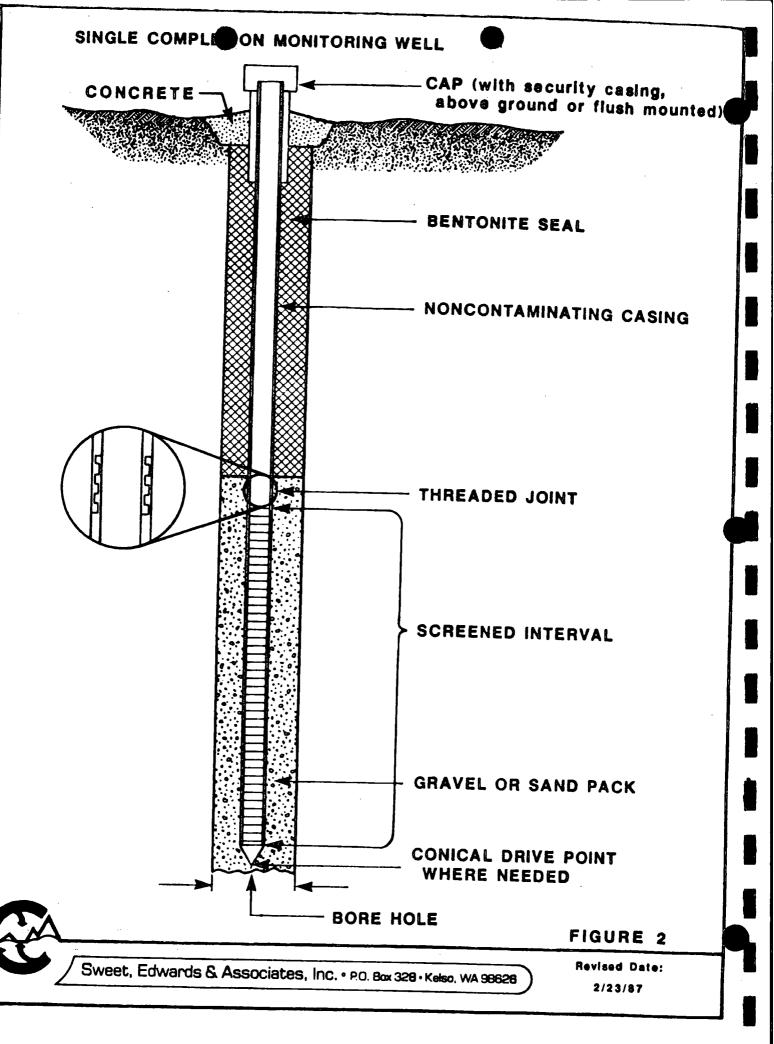




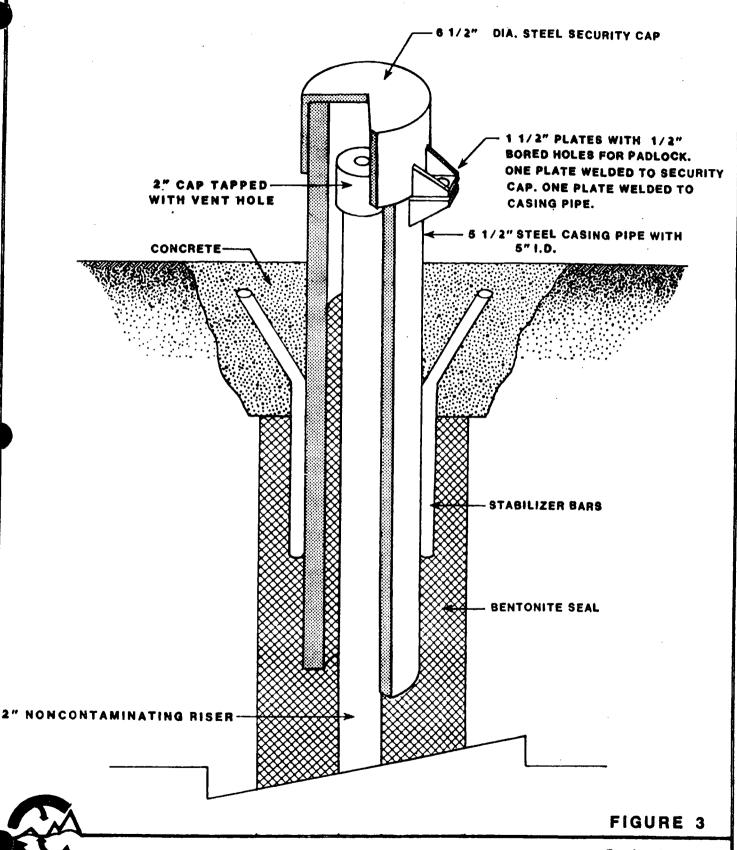
Sweet-Edwards EMCON

Site Map

Figure 1



MONTORING WELL SECURITY CASING



Sweet, Edwards & Associates, Inc. • PO. Box 328 • Kelso, WA 98626

Revised Date 6/17/85

2.2 WATER QUALITY SAMPLING

2.2.1 Ground Water Sampling

The monitoring wells have been sampled eight times since the wells were completed (see Table 2). Blind duplicate samples were collected and submitted for analysis for the May 9 and July 7, 1988 sampling events. Blind quadruplicate samples were collected and submitted for the November 4, 1987 sampling event. A split sample from each monitoring well was collected and submitted to the Weyerhaeuser Analytical Laboratory for the May 9, 1988 sampling event. All other laboratory analysis have been completed by Columbia Analytical Services, Longview, Washington.

Wells are purged and sampled using a peristaltic pump connected to polyethylene tubing dedicated to each well. Samples are collected in bottles provided by the contract laboratory. Prior to initial purging water levels are measured using an electric well sounder. The wells are purged prior to sampling until a minimum of three pore volumes have been removed and field pH and/or specific conductance values have stabilized (±10%).

Beginning with the November 4, 1987 sampling event, transfer blanks (field blanks) were collected during sampling. Blanks consist of distilled water samples collected using the same equipment and decontamination procedures employed in collection of ground water samples.

The depths to water, field water quality data, decontamination and sampling procedures for each well are recorded on the Field Data Forms (see Appendix B) upon completion of sampling. All samples are delivered to the contract laboratory where custody is transferred (see Chain of Custody forms, Appendix C).

TABLE 2
WATER SAMPLING SUMMARY

LOCATIONS	SAMPLE DATES	COMMENTS
MW-1, MW-2	8-5-87	_
MW-3, MW-4	9-3-87	
131 37 131 4		
	11-4-87	Quadreplicate samples
	1-12-88	_
	3 - 7-88	
	5-9-88	Duplicate samples and split sample to Weyerhaeuser Analytical Laboratory
	7-7-88	
	8-5-88	
S-X, S-Y and S-Z	9-3-87	
	5-9-88	Duplicate samples and split sample to Weyerhaeuser Analytical Laboratory
S-M	5 - 9-8 8	Duplicate samples and split sample to Weyerhaeuser Analytical Laboratory

2.2.2 Surface Water Sampling

During the September 3, 1987 and May 9, 1988 sampling event, water samples were collected from three surface water locations. These locations are designated S-X, S-Y and S-Z (see site map Figure 1). A fourth surface water location, S-M, was sampled on only May 9, 1988.

Surface water sampling site S-M is in the marsh area at the western edge of the Weyerhaeuser property. Surface water has only occasionally been observed at this location during wetter portions of the year. Samples were collected as grab samples from standing surface water.

Surface water sampling sites S-X, S-Y and S-Z are adjacent to the Columbia River. Water samples were collected from shallow hand auger borings excavated within 10 to 15 feet of the water line of Four-inch diameter PVC pipe was used to temporarily stabilize the borehole wall while water samples were collected using a peristaltic pump. Water samples were collected in this manner to provide an indication of mercury concentrations in the shallow ground water system at the point of discharge to surface These sample locations minimize the influence on the water. water sample of dilution which would occur if samples were collected directly from the river. Sampling points have not been permanently established. Exact locations of the three sampling points varies between the September 3, 1987 and May 9, 1988 sample dates.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

All field work was completed following requirements of Sweet-Edwards/EMCON QA/QC procedures. All drilling and soil sampling equipment was decontaminated before use at each drilling/sampling location. Drilling equipment was cleaned using a high

pressure/hot water washer. Water sampling equipment was cleaned using a non-phosphatic detergent wash followed by a methanol rinse and a deionized water rinse.

3.0 GEOLOGY AND HYDROGEOLOGY

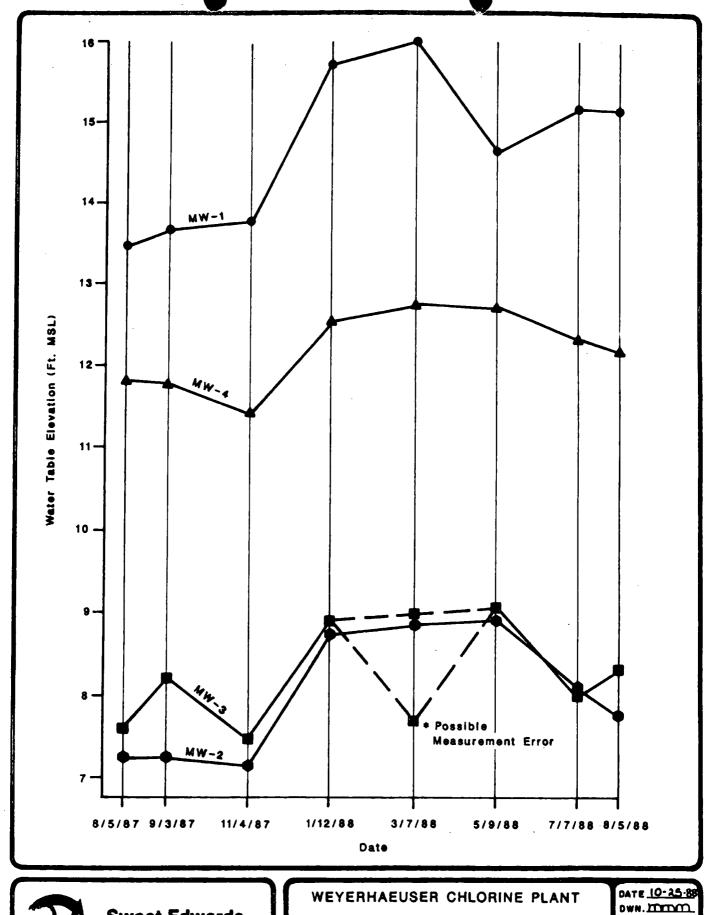
3.1 GEOLOGY

The site area is on the floodplain of the Columbia River. At the site a surficial layer of dredged sand fill overlies natural floodplain sediments. The floodplain sediments consisting of alluvial silt, sandy silt and silty sand were encountered at a depth of approximately 20 feet in monitoring well MW-4 (see well logs, Appendix A). The sediments are overlain by medium grain dredge sand fill. The remaining three monitoring wells did not fully penetrate the dredge sand fill. The sand fill at those well sites is at least 20 feet thick.

The initial well MW-3 borehole site was approximately 200 feet east of the MW-3 well site shown on Figure 1. Basalt bedrock was encountered at depths of approximately 5-1/2 feet in two borehole locations a few feet apart. A basalt knob (thought to be an erosional remnant), reportedly existed in the general area of the Chlorine Plant. This feature, variously called Coffin Mountain, Mt. Coffin, or Coffin Rock, was excavated by quarrying to provide rock fill material for the industrial area. No surface exposure of the basalt is thought to remain. The basalt encountered in the two drill holes east of monitoring well MW-3 are assumed to represent approximately the southwesterly or westerly limit of the basalt knob.

3.2 HYDROGEOLOGY

The Columbia River is the discharge area for deep regional ground water flow systems recharged in the Cascade Mountains and foothills. The regional flow system is overlain by the shallow local flow system which is recharged primarily by rainfall infiltration. The four site monitoring wells are screened in the shallow water table aquifer.



Sweet-Edwards **EMCON**

Monitoring Well Hydrographs

Figure 4

4.0 LABORATORY TESTING RESULTS

All laboratory testing has been completed by Columbia Analytical Services except for split samples of ground water sent to Weyerhaeuser Analytical Laboratory, May 9, 1988.

4.1 SOIL QUALITY RESULTS

A total of 34 soil samples were collected at 2-1/2 foot intervals during construction of the monitoring wells. Samples were submitted for analysis of total mercury and EP toxicity mercury concentrations. Laboratory testing results are presented in Table 4.

Total mercury concentrations were above the detection limit (0.1 mg/kg) in 6 of the 34 samples collected. These samples were:

WELL	SAMPLE DEPTH (FT.)	MERCURY CONCENTRATION (mg/kg)
MW-2 MW-3 MW-4 MW-4 MW-4 MW-4	10 - 11.5 5 - 6.5 5 - 6.5 7.5- 9 10 - 11.5 22.5- 24	0.46 1.9 0.2 0.2 0.1

EP Toxicity mercury concentrations exceeded the detection limit of 0.0002 mg/L for 5 of the 34 samples. These samples were:

WELL	SAMPLE DEPTH (FT.)	MERCURY CONCENTRATION (mg/L)
MW-1 MW-2 MW-3 MW-4 MW-4	12.5 - 14 10 - 11.5 5 - 6.5 17.5 - 19 20 - 21.5	0.0043 0.00021 0.00024 0.0005

None of the soil samples were found to have mercury concentrations which exceeded the 0.2 mg/L EP Toxicity limit (see Table 4). It was observed that only two soil samples (MW-2 10-

Depth to ground water in the shallow aquifer ranges from about 8 to 15 feet below ground surface at the site wells. The depth is controlled primarily by ground surface elevation, seasonal fluctuations, and to a lesser degree by river stage fluctuations.

The pattern of water table elevation contours on Figure 1 show that shallow ground water flow is southwest toward the river bank. The contour pattern generally parallels the topography, as expected with a water table aquifer. There are additional components of flow to the wetlands to the west. Due to the coarse grained dredge spoil surface soils, there is little or no surface water runoff from the site.

As indicated on the monitoring well hydrographs (Figure 4) and the hydrology data table (Table 3), seasonal ground water table elevations through the one year period of record fluctuate approximately 2 to 2-1/2 feet. Water levels were lowest when measured in August 1987 (monitoring well MW-1) and November 1987 (monitoring wells MW-2, MW-3 and MW-4). Water table elevations were highest in March 1988 (monitoring wells MW-1 and MW-4) and May 1988 (monitoring wells MW-2 and MW-3).

TABLE 3
WEYERHAEUSER - CHLORINE PLANT
HYDROLOGY DATA

MONITORING WELL	MEASURING PT. ELEVATION	DATE	DEPTH TO WATER	WATER TABLE ELEVATION
MW-1	24.48	08/06/87	11.04	13.44
		09/03/87	10.83	13.65
		11/04/87	10.73	13.75
		01/12/88	8.79	15.69
		03/07/88	8.46	16.02
		05/09/88	9.85	14.63
		07/07/88	9.29	15.19
		08/05/88	9.30	15.18
W-2	18.00	08/06/87	10.76	7.24
		09/03/87	10.75	7.25
		11/04/87	10.86	7.14
		01/12/88	9.26	8.74
		03/07/88	9.13	8.87
		05/09/88	9.07	8.93
		07/07/88	9.91	8.09
		08/05/88	10.24	7.76
[₩ - 3	17.84	09/06/97	10.26	
•	17.04	08/06/87	10.26	7.58
		09/03/87	9.62	8.22
		11/04/87	10.38	7.46
		01/12/88	8.93	8.91
		03/07/88	10.15*	7.69*
		05/09/88	8.76	9.08
		07/07/88	9.84	8.00
		08/05/88	9.51	8.33
W-4	26.73	08/06/87	14.92	11.81
		09/03/87	14.94	11.79
		11/04/87	15.33	11.40
		01/12/88	14.19	12.54
		03/07/88	13.96	12.77
		05/09/88	14.02	12.71
		07/07/88	14.41	12.32
		08/05/88	14.56	12.17

^{*} NOTE: Anomalous measurements - possible measurement error

TABLE 4 LABORATORY SOIL QUALITY DATA

	ty Standard (1			0.2
			MERCURY CO	DNCENTRATIO
WELL OR	SAMPLE	SAMPLE	TOTAL	EPTOX
SITE NO.	DATE	DEPTH(FT.)	(mg/kg)	(mg/L
MW-1	07/20/87	2.5- 4	0.1 L	0.0002
	• •	5.0- 6.5	0.1 L	0.0002
		7.5- 9	0.1 L	0.0002
•		10.0-11.5	0.1 L	0.0002
		12.5-14	0.1 L	0.0043
		15.0-16.5	0.1 L	0.0002
		17.5-19	0.1 L	0.0002
•		20.0-21.5	0.1 L	0.0002
MW-2	07/21/87	2.5-4	0.1 L	0.0002
	• •	5.0-6.5	0.1 L	0.0002
		7.5-9	0.1 L	0.0002
		10.0-11.5	0.46	0.0002
		12.5-14	0.1 L	0.0002
		15.0-16.5	0.1 L	0.0002
		17.5-19	0.1 L	0.0002
		20.0-21.5	0.1 L	0.0002
MW-3	07/21/87	2.5-4	0.1 L	0.0002
	,,	5.0-6.5	1.9	0.0002
		7.5-9	0.1 L	0.0002
		10.0-11.5	0.1 L	0.0002
		12.5-14	0.1 L	0.0002
		15.0-16.5	0.1 L	0.0002
		17.5-19	0.1 L	0.0002
		20.0-21.5	0.1 L	0.0002
MW-4	07/23/87	2.5-4	0.1 L	0.0002
	,,	5.0-6.5	0.2	0.0002
		7.5-9	0.2	0.0002
		10.0-11.5	0.1	0.0002
		12.5-14	0.1 L	0.0002
		15.0-16.5	0.1 L	0.0002
		17.5-19	0.1 L	0.0002
		20.0-21.5	0.1 L	
		22.5-24	0.1	0.0005
		25.0-26.5	0.1 L	0.0002 0.0002
-x	09/03/87	4-5	0.2 L	==+
- Y	09/03/87	4-5	0.2 L	
-Z	09/03/87	4-5	0.2 L	0.0005

NOTES: MW = Monitoring Well
L = Less Than

11.5 feet, and MW-3 5-6.5 feet) had mercury concentrations above the detection limits for both total and EP Toxicity analysis.

As indicated above, the highest total mercury concentrations were found in soil samples from monitoring wells MW-2 and MW-3 in the 10 to 11.5 and 5 to 6.5 foot samples, respectively. Four of the ten soil samples from MW-4 contained total mercury concentrations at or slightly above the 0.1 mg/kg detection limit. It is not known why the higher concentrations at only one depth were found in MW-2 and MW-3.

Soil/sediment samples were also collected from depths of 3 to 5 feet at sample locations S-X, S-Y and S-Z. Total mercury concentrations in all three samples was below the detection limit of 0.2 mg/kg. An EP Toxicity analysis was completed for sample S-Z. The EP Toxicity mercury concentration was below the 0.0005 mg/L detection limit.

4.2 WATER QUALITY RESULTS

As previously discussed, water samples were collected on eight separate dates over a one year period. Laboratory detection limits varied for different sample dates and different wells due to the wide range in sodium chloride (NaCl) concentrations and the resulting specific conductance values (see Table 5).

The mercury concentrations exceeded the laboratory detection limit for all four monitoring wells on at least one occasion. Mercury concentrations exceeded the Primary Drinking Maximum Contaminant Level (MCL) on two sample dates monitoring well MW-3 (8/5/87 and 1/12/88) and all sample dates for monitoring well MW-4 (see Water Quality Data, Table 5). split sample sent to the Weyerhaeuser Analytical Laboratory for surface water sample site S-X was the only surface water sample which was found to have mercury at or above the detection limit.

Page 1 of 3

TABLE 5 WEYERHAEUSER PAPER COMPANY LONGVIEW CHLORINE PLANT WATER QUALITY DATA

T 0.03 (TT 0)			Hg AVERAGE		FIELD COND.		LAB COND.
LOCATION	SAMPLE DATE	Hg (mg/L)	for sample date	FIELD pH	(umhos/cm)	LAB pH	(umhos/cm)
ICL	04-3	0.002					
Secondar	y sta.			6.5-8.5		6.5-8.5	
M -1	08/05/87	0.0002 L			988		****
	09/03/87	0.0005 L		7.34	1,300		
	11/04/87	0.0002 L		7.31	881		
	11/04/87	0.0002 L		7.31	881		
	11/04/87	0.0002 L	0.0002 L	7.31	881		
	11/04/87	0.0002 L		7.31	881		
	01/12/88	0.0005		7.05	441	7.1	740
	03/07/88	0.0008 L				6.7	890
	05/09/88	0.0002 L		6.88	542	7.0	720
	05/09/88 duplicate	0.0002 L	0.0002 L	6.88	542	6.9	750
	05/09/88 split-WAL	0.0002 L					
	07/07/88	0.001 L	0.0006 L	6.24	963	7.0	874
	07/07/88 duplicate	0.0002 L					
	08/05/88	0.0002 L	0.0002 L	5.92	934	8.7	876
	08/05/88 duplicate	0.0002 L					
4- 2	08/05/87	0.0002 L					
	09/03/87	0.0005 L		6.62			
	11/04/87	0.0002 L		6.37	**		· .
	11/04/87	0.0002 L		6.37	**		
•	11/04/87	0.0002 L	0.0002 L	6.37	**		
	11/04/87	0.0002		6.37	**		
	01/12/88	0.002		6.85	**	6.4	63,000
	03/07/88	0.0008 L				6.3	49,000
	05/09/88	0.0008 L		6.74	25,000	6.5	38,440
	05/09/88 duplicate	0.0008 L	0.0006 L	6.74	25,000	6.4	37,060
	05/09/88 split-WAL	0.0003 L					
	07/07/88	0.001 L	0.0006 L	6.97	39,800	6.6	34,900
	07/07/88 duplicate	0.0002 L					
	08/05/88	0.0002 L	0.0002 L	7.06	41,800	7.6	39,000
	08/05/88 duplicate	0.0002 L					

LOCATION	SAMPLE DATE	Hg (mg/L)	Hq AVERAGE	FIELD pH	FIELD COND. (umhos/cm)	LAB pH	FIELD COND (umhos/cm)
₩- 3	08/05/87	0.004 E					Tuninos/Cin)
	09/03/87	0.0005 L					
	11/04/87	0.0003 L		6.86		-	
	11/04/87	0.0002 L		5.56	13,670*		
	11/04/87	0.0002 L	0 0000 =	5.56	13,670*		
	11/04/87	0.0002 L	0.0002 L	5.56	13,670*		
	01/12/88	0.0002 L		5.56	13,670*		
	03/07/88	0.0008 L		5.30	**	6.2	283,800
	05/09/88	_				5.2	474,000
	05/09/88 duplicate	0.0008 L		6.39	186,300	6.9	448,000
	05/09/88 split-WAL	0.0008 L	0.0007 L	6.39	186,300	6.8	492,000
	07/07/88	0.0005 L					452,000
	07/07/88 duplicate	0.001 L	0.001 L	7.16	**	6.7	398,000
	08/05/88 duplicate	0.001 L					330,000
	08/05/88 duplicate	0.0009 L	0.0009 L	7.15	**	7.7	576,000
	ooyooyoo dupiicate	0.0009 L					
₩ -4	08/05/87	0.039 E					
	09/03/87	0.033 E		11.35	15,200		
	11/04/87	0.027 E		11.50	± *		
	11/04/87	0.031 E		11.50	*		
	11/04/87	0.025 E	0.028 E	11.50	*		
	11/04/87	0.030 E	0.020 1	11.50	*		
	01/12/88	0.012 E					
	03/07/88	0.012 E		10.6	2,300	10.2	3,638
	05/09/88	0.0026 E		0.60	4 400	10.7	7,320
	05/09/88 duplicate	0.0026 E	0.0024 E	9.62	4,600	9.3	3,200
	05/09/88 split-WAL	0.0020 E	0.0024 E	9.62	4,600	9.3	3,200
	07/07/88	0.004 E	0.005 E	2 21			
	07/07/88 duplicate	0.006 E	0.005 E	7.71	5,830	9.3	3,984
	08/05/88	0.018 E	0.020 E	7.10			
	08/05/88 duplicate	0.021 E	0.020 E	7.12	9,500	10.4	11,500
	• •	3.002 H					
	09/03/87	0.005 L		6.5	206		
	05/09/88	0.0002 L		6.32	359		
	05/09/88 duplicate	0.0002 L	0.0002 L	6.32	359 359	6.9	204
(05/09/88 split-WAL	0.0002		U.JZ	J0 3	6.9	208

LOCATION	SAMP	LE DATE	Hg (mg/L)	Hg AVERAGE	FIELD pH	FIELD COND. (umhos/cm)	LAB pH	FIELD COND. (umhos/cm)
S-Y	09/03/87		0.005 L					
	05/09/88		0.0002 L		6.4	169		
	05/09/88	duplicate		0 0000 -	6.94	164	8.0	202
	•	-	0.0002 L	0.0002 L	6.94	164	7.8	204
	05/09/88	split-WAL	0.0002 L					
	09/03/87		0.005 L		6.5	177		
	05/09/88		0.0002 L		7.17			
	05/09/88	duplicate	0.0002 L	0.0002 L		219	8.4	228
	05/09/88	split-WAL	0.0002 L	0.0002 11	7.17	219	8.0	224
	00, 00, 00	SPIIC WILL	0.0002 1			***		
	05/09/88		0.0002 L		7.75	783	7.9	852
	05/09/88	duplicate	0.0002 L	0.0002 L	7.75	783	7.8	830
	05/09/88	split-WAL	0.0002 L					
TRANSFER	11/04/87		0.0004					
BLANK	01/12/88		0.0009					
	03/07/88		0.0003 0.0008 L				5.5	5
	05/09/88						7.5	4.9
			0.0002 L				7.7	3
	05/09/88		0.0002 L	0.0002 L			7.6	2
	05/09/88	split-WAL	0.0002 L					
	07/07/88		0.0002 L				6.8	4
	08/05/88		0.0002 L				6.9	54

KEY TO SYMBOLS:

MW = Monitoring Well

MCL = Primary Drinking Water Maximum Contaminant Level

Secondary Standard = Secondary Drinking Water Standard

* = Probable meter malfunction

^{** =} Conductivity values appear to have exceeded the instrument limit. S-X - S-Z = Shallow Ground Water Sample Adjacent to River

S-M = Surface Site (Marsh)

L = Less Than

E = Exceeds Maximum Contaminant Level

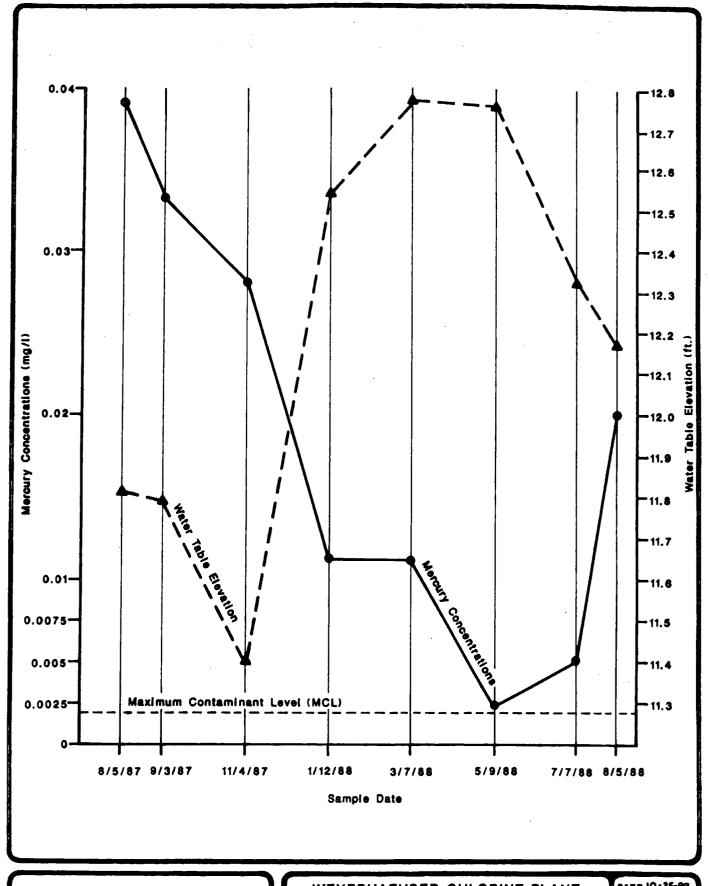
WAL = Weyerhaueser Analytical Laboratory

Transfer/field blank mercury concentrations of 0.0004 and 0.0009 mg/L exceeded the detection limit for samples collected November 4, 1987 and January 12, 1988, respectively. It is believed that this is most likely due to mercury contamination in the commercially purchased distilled water, although field or laboratory contamination are possible. Samples from three of the monitoring wells (MW-1, MW-2, and MW-3) had mercury concentrations below the 0.0002 mg/L detection limit for the November 4, 1987 sampling date. Ground water samples collected on this date were apparently unaffected by the source or cause of mercury found in the blank.

Mercury concentrations in ground water samples collected from all wells during the January 12, 1988 sampling event were above detection limits. This was the only date for monitoring wells MW-1 and MW-2 and one of two dates for monitoring well MW-3 for which mercury concentrations above detection limits were reported. It is possible that ground water samples were impacted by the distilled water or the same source/cause of mercury in the distilled water.

Mercury concentrations in water samples from monitoring well MW-4 ranged from 0.002 mg/L (5/9/88 - Weyerhaeuser Analytical Laboratory Split Sample) to 0.039 mg/L (8/5/87 sample). The overall well MW-4 average mercury concentration is 0.019 mg/L, approximately 10 times the MCL limit of 0.002 mg/L.

As indicated on the graph of mercury concentrations versus water table elevations in monitoring well MW-4 (see Figure 5) there is an apparent inverse relationship indicated. Increases in the water table elevation appears to roughly correspond to decreases in the mercury concentration. This is likely due to increased dilution and/or increased ground water flow rates resulting from





Sweet-Edwards EMCON WEYERHAEUSER CHLORINE PLANT Mercury Concentration/Water Table Elevation Monitoring Well MW-4

Figure 5

DATE 10-25-89
DWN. MMM

EVIS.____

14101.02

increased incident precipitative recharge to the shallow ground water system.

It is apparent that ground water quality, at least in the area of monitoring well MW-4 has been impacted by past activity at the site. No projection of the lateral extent of ground water with elevated mercury concentrations is possible with the available data.

APPENDIX A

WELL LOGS

APPENDIX A

MONITORING WELL LOGS

WEYCO-R.205LK



PROJECTweyerhaeuser-Chlor:	INE PLANT Page 1 of 1
Location _SEE MAP	Boring No. MW-1
Surface Elevation 24.48 Top of Casing	Drilling Method Hollow Stem Auger
Total Depth 21.5 feet	Drilled By Mountain States Drilling
Date Completed	Logged By _C. Wells

	7							
WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	S/	MPLE	PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
1		0					0-20' <u>SAND</u> , gray, medium grained,	
S S S			1	SSP			poorly graded, loose, trace silt, occasional fine	
nite		- 5	2	11			sand zones, saturated below ~10 feet.	
Bentonite			3	n			(FILL).	-
	모	- 10						
PVC	_		4	-"				
S S			5	*		SP		
S		- 15	6	11				į.
Sand-			7	10				
S.		- 20						
		}	8	"				
PVC 010" -		į						
80 P w/0.0		25						
2" Sch. Screen Slots	-							
					:		:	:
	<u></u>							

PROJECT <u>WEYERHAEUSER-CHLORI</u>	NE PLANT Page 1 of 1
Location <u>See map.</u>	Boring No. MW-2
Surface Elevation 18.00 Top of Casing	Drilling Method Hollow Stem Auger
W-A-1 B 44 B4 B	Drilled By Mountain States Drilling
	Logged By C. Wells

WELL DETAILS TRATION THE TRATI
1 SSP 1 SSP 2 " 3 " 3 " 5 " 5 " 5 " 15 6 " 7 " 10 8 " 10 8 " 10 8 " 10 8 " 10 8 " 10 8 " 10 8 " 10 8 " 10 8 " 10 9.5-14.5' INTERBEDDED SAND and SILT, dark gray, slightly to moderately cohesive, nonplastic, many organics, saturated. 14.5-20.5' SAND, dark gray, fine to medium grained, poorly graded, saturated.
Sch. 80 PVC Screen

PROJECT WEYERHAEUSER-CHLOR	INE PLANT Page 1 of 1
Location See Map	Boring No. MW-3
Surface Elevation 17.84 Top of Casing	Drilling Method Hollow Stem Auger
Total Depth 21.5 FEET	Drilled By Mountain States Drilling
Date Completed	Logged By C. Wells

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	NO.	AMPLE	PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
Casing		0	1	SSP		SP	0-4.5' SAND, brown, medium grained, poorly graded, loose, damp, (FILL).	
Bent		- 5	2	п		SP-OL	4.5-7' FINE SANDY SILT, black, organic, slightly cohesive,	
	<u>~</u>	- 10	3	**			moist (Clarifier Sludge). 7-17' SAND, gray-	
	_		4				dark gray, medium grained, poorly to well graded,	
Pues		· 15	5	-		SW	loose, some gravels and organic material 10-12	
Salots		ļ. -	7				feet, saturated below ~10 feet.	
	-	20	8	70		SP	17-21.5' <u>SAND</u> , dark gray, fine grained, poorly graded, saturated.	
2" Sch. 80 PVC Screen w/0.010		25					sacuraced.	

PROJECTWEYERHAEUSER-CHLOR	INE PLANT Page 1 of I
Location See Map.	Boring No. MW-4
Surface Elevation 26.73 Top of Casin	
Total Depth 26.5 feet	Drilled By Mountain States Drilling
Date Completed	Logged By C. Wells

WELL DETAILS	PENE- TRATION TIME/	DEPTH (FEET)	s	AMPLE	PERME- ABILITY	SYMBOL	LITHOLOGIC DESCRIPTION	WATER
Bentoni te Casing		(FEET) 0	NO. 1 2 3	TYPE SSP			0-9.5' SAND, brown- gray brown, medium grained, poorly graded, moist, (FILL).	WATER QUALITY
			5	11		SW	9.5-12' SAND, gray brown, medium to coarse grained, well graded, loose, damp.	
See	<u>₹</u>	<u>}</u>	7	"		SP	12-20.5' SAND, gray brown, gray, medium grained, poorly graded, saturated below 15 feet.	
Slots		-	9	n		SP-ML	20.5-24' SANDY SILT, SILTY SAND, very dark gray, black, slightly to moderately cohesive, some organic	•
w/0.010"		25	0	,,		ML	material, saturated, (strong petroleum odor?). 24-26.5' SILT, gray, moderately cohesive,	
2" Sch. 80 PVC Screen		30					trace sand.	

APPENDIX B

FIELD DATA FORMS

WEYCO-R.N07 TS S4101.02



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

Fleid Sampling Data

			LORINE, INT	CAOX		Well or Surfa	gnation		
						Date, Time_	1156 A		3.5.07
CLIENT	CONTACT					Weather_0	VERCAST		
HYDROL	LOGY MEASUREM	ENTS:							
_	(Nearest .01 ft.)	Ele:	vation Date, Time			Method Used (M-Scope Number or Other)			
WELL EV	VACUATION:								
	ialions Po	ore Volumes		lethod Used n'staltre	. <u> </u>	Rinse Method Sample	_		, Time 220
Surface V	Water Flow Speed			Measurement I	Method		, Da	ate, Time	
SAMPLIN	IG: 2	of each	bottle						
Sample	Date, Time 8-5 /220	Method	Volume (ml) 500	Container Type	Depth Taken (feet)	Field Filtered (yes,no) yes	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphatic
, ,	11 11		7000 500 200	Poly Glass Poly	19' 19'	<u>10,</u>			detergent wash H2O rinse MeOH rinse Distilled H2O
<i>"</i>	$\frac{n}{n}$		500					· <u>v</u>	rinse
IELD W	ATER QUALITY TE	STS:			1		-		
Pore Vol. Number	•	Conductivity	Tem	p Eh	<u> </u>				
16	- <u>-</u>	988 Uns					 • -		
		988 0 = 3							
	-,	988 Uni							
OTES:		988 Una							
		988 Und							
		988 Uni							
		788 Uni							
		788 Und					· · · · · · · · · · · · · · · · · · ·		
		788 Und							
		788 Und							
		788 Uni							
		788 Uni							



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATIO	N/ADDRESS	CHERMUMSI	« «LO)	EINE / INTE	KOT		ce Site Numbe gnation		1-2
PROJECT				_ (Date, Time	8-5-8	7	
	ONTACT					Weather 0	WRC AST		
	OGY MEASUREMEN (Nearest .01 ft.)		ation	Date, Ti	me	Metho	od Used (M-Sc	ope Numbe	r or Other)
Ga	ACUATION: Ilons Pore	Volumes	الم	ethod Used 4 LASTAL r -C		Rinse Method		Date,	Time
Surface W	ater Flow Speed _	,	 ,	Measurement N	Method		, Da	ate, Time	
Sample	Date, Time 5-5 /3:30 pm	Method MC 15747 K	Volume (mi)	Container Type 130 LY Po LY	Depth Taken (feet)	Field Filtered (yes,no) YES	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash
· · · · · · · · · · · · · · · · · · ·	h 1/2	7 	200 500	CLAS:	19 ' 19 ' 19 !	NO NO			H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	pH	T&: Conductivity	Tem	p Eh					
IOTES:	BUCT,U, TY	METER	1.5	/V 07 0P	(e 47 · my				
otal # of B	Nottles: /0					Signature:			SFA-A00-01



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

Field Sampling Data

	N/ADDRESS	WETERAUS	EL CL	CRINE INT	ELOX	Well or Surfa	gnation^		
PROJECT							8-5-8		ر. 3 0
							SVERC AS		
									
	DGY MEASUR								
	(Nearest .01 f	t.) E	levation	Date, T	ime	Meth	od Used (M·S	cope Numbe	er or Other)
-	···)			······································				
				•	 ,				
WELL EV	ACUATION:					<u>-</u>			
Ga	llons	Pore Volumes	N	lethod Used		Rinse Metho	d	Date	, Time
	<u> </u>	7.5	PE	LISTALTIC	_,	SAMPLE		8-5-87	15.30
			-ı		_•				
Surface W	ater Flow Spe	ed		Measurement i	Method		, C	ate, Time _	
SAMPLIN	<u> </u>								
SAMPLEN	G:				Donth	21 - 1 - 4			
	Date.		Volume	Container	Depth Taken	Field Filtered	- Cranania		Sampler
Sample	. Time	Method	(ml)		(feet)		Preserva-	lced	Cleaning
Mu-3		15:30 PELISTALT		Type ALY	(1001)	(yes,no) <u> </u>	tive -	(yes,no)	Method
"	8-5-87	1.	<u> </u>	POLY		No.		. <u> </u>	Non-Phosphatic
4	-11	<u>f</u> , <u>d</u> ,	520	GLASS.	 -	<u> </u>			H2O rinse
7	11	, , , , , , , , , , , , , , , , , , , 	200	POLY				-· -	MeOH rinse
<u>'.</u>	<u>''</u> !	<u> </u>	**************************************	1111	 ;	<u> </u>			Distilled H2O rinse
 -	11 .	—· · · · · · · · · · · · · · · · · · ·	<u></u>					_, <u>/</u> ,	mag
	. ,		*			MAN.			
FIELD WA	TER QUALITY	_,,				<u> </u>			
		_,,	Tem						
Pore Vol.	TER QUALITY	TESTS:	Tem	p Eh					
Pore Vol.	TER QUALITY	TESTS:	Tem	p Eh					
Pore Vol.	TER QUALITY	TESTS:	Tem	p Eh					
Pore Vol.	TER QUALITY	TESTS:	Tem	p Eh					
Pore Vol. Number	PH	Conductivity	Tem	p Eh					
Pore Vol. Number	PH	TESTS:	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh			,		
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					
Pore Vol. Number	PH TER QUALITY PH TU.TY METER	Conductivity	Tem	p Eh					



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

SAMPLING: Date, Volume Container Taken Filtered Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) tive (yes,no) Northosphale Preserve Iced Cleaning Method (ml) Type (leet) (yes,no) tive (yes,no) ti	PROJECT	DN/ADDRESS T NAME CONTACT			LORINE INT	E NOT	Well or Surface Site Number Sample Designation 7 4 Date, Time 8-3-87				
WELL EVACUATION: Gallons Pore Volumes Method Used Finse Method Date, Time Sample Sample Time Method Date, Time Sample Time Ontainer Taken Filed Preserve Load Sampler Sample Time Wethod (mil Type (seet) (year.ne) tive (year.ne) Method Finse Preserve Load Sampler """ "" " " " " " " " " " " " " " " "							Weather				
Gallons Pore Volumes All Annual Container Sample Time Method Used Measurement Method Date, Time Sample Time Method Used Measurement Method Date, Time Depth Field Sample Time Method (mi) Type (feet) (yes,no) tive (yes,no) tive (yes,no) tive (yes,no) tive (yes,no) fill (yes) Method Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Sample Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes,no) tive (yes,no) fill (yes) Time Method (mi) Type (feet) (yes,no) tive (yes,no) fill (yes,no) tive (yes,no) fill (yes,no) fill (yes,no) tive (yes,no) fill (evation	Date, T	ime	Meth	od Used (M-	Scope Numbe	er or Other)	
SAMPLING: Date, Volume Container Taken Filtered Preserve Iced Cleaning Method (ml) Type (lest) (yes,no) two (yes,no) Wethod (yes,no) Type (lest) (yes,no) two (yes,no) Method (yes,no) Type (lest) (yes,no) two (yes,no) Method (yes,no) Type (lest) (yes,no) two (yes,no) Method (yes,no) Type (lest) (yes,no) two (yes,no) Type (lest) (yes,no) two (yes,no) Type (lest) (yes,no) two (yes,no) two (yes,no) Type (lest) (yes,no) two (yes,no) t	Ga	illons Por							Date 8-5-87	i, Time - 14 30	
Date, Volume Container Taken Fileted Preserve load Sampler Time Time (yea.no) tive (ye	Surface W	ater Flow Speed	•		Measurement I	Method			Date, Time _		
TOO POLY " Me " () designed was H2O rings (LASS " " " Me " () designed was H2O rings (LASS " " " Me M2O rings (LASS " " Me M2O rings (LASS " " " " Me M2O rings (LASS " " " " Me M2O rings (LASS " " " " M2O rings (LASS " " " " " " M2O rings (LASS " " " " " " M2O rings (LASS " " " " " " " " " " " " " " " " " "	Sample	Date, Time		(ml)	Туре	Taken (feet)	Filtered (yes,no)		(yes,no)	Cleaning Method	
TIELD WATER QUALITY TESTS: Pore Vol. Number pH Conductivity Temp Eh OTES: CONDUCTIONTY MATRA NOT WORKING ORANGE DOT BOTTUGS WERE FIELD FILTRED	"	10 11 11 11 11 11 11 11 11 11 11 11 11 1	· · · · · · · · · · · · · · · · · · ·	/000 586 200 500	POLY GLASS	// //	11'			MeOH rinse Distilled H2O	
CONDUCTIVITY METEL NOT WORKING ORANGE DOT BOTTLES WERE FILLD FILTERED		рН 	Conductivity	Tem	P Eh						
		CON DUCTIV	177 P	LTRL	NOT	WORK	46				
tal # of Bottles:		LANGE D	T Set	TUES	WELE	FIEL	O FILT	CLLO			
tal # of Bottles:											
ital # of Bottles: 10 Signature: Signature:											
	tal # of Bo	ottles: /D					Signature:_	an	- In	ka	



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Field Sampling Data

_	N/ADDRESS		· .		Well or Surface Site Number MU./ Sample Designation <u>WI-9-3-C</u> Date, Time 1-3-87 / 1/30					
	NAME <u>Ley</u> ONTACT <u>Ke</u>	Johnson	<u>* </u>	\$ 54106		Date, Time	9-3-87 UNNY	1436	·	
	GY MEASUREM Nearest .01 ft.)		85 H vation	Date, T	ime (Method Used (M-Scope Number or Other)				
		ore Volumes	peni	4 <u> </u>	Rinse Method Date, Time					
Surface Wa	ater Flow Speed			Measurement I	Method		, D	ate, Time _		
Sample	Date, Time 9/3/87	Method per: 3 h Hrc, perg	Volume (ml) DO /doa 250	Container Type Poly	Depth Taken (feet) /5'	Field Filtered (yes,no)	Preserva- tive NoOH	ced- (yes,no)	Sampler Cleaning Method. Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
Pore Vol. Number	pH	Conductivity 2,290 / Joo 2	Tem /5.							
NOTES:	<u> </u>									
Pore Lab	colur=	1.3gel								
	ter "meta	13" sample	ו און	« š						
Total # of B	ottles:3					Skanature	SPHens	(han)		



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LOCATI	On/Address	······································					ace Site Numb اللك ignation		
	TNAME _ We,			# 54106.	01	Date, Time_	4/3/87	1401	,
CLIENT	CONTACTKE	- Johnson				Weather	Unny		
HYDROL	OGY MEASUREM (Nearest .01 ft.)		75 Lel evation	Date, T		Meth 	od Used (M-Sc	cope Numbe	er or Other)
G	ACUATION: allons Po	re Volumes		Method Used		Rinse Metho	d <u>9</u> /	-/F 7 ^{Date}), Time 1401 -
Surface v	Vater Flow Speed			Measurement !	Method		, D	ate, Time _	
Sample	Date, Time 9/3/17-	Method per.; h/fx punp	Volume (ml) 500 /000 250	Container Type poly poly	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive H NO3 NG OH	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number Z 3	PH B 25	Conductivity	Tem, 15.	<u>/</u> ,	-,,,,,,,,,,				
OTÉS:	- لدي م		,						
	<u>و ۱۵۱. =</u>								
	colur =				-				
	Nd. too		(la.) with	meter				
	I:1+6 ",	metals A	samp	le ,~	146				
					······				
otal # of 8	Sottles: 3					Signature:	SP Han	de	
						Ba.c. 6.			SEA-400-01



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Field Sampling Data

LOCATION/A PROJECT NA CLIENT CON	AME _ W	YCO INTE LEN JOHN		0/	Well or Surface Site Number MN - 3 Sample Designation UI - 9-3-1 Date, Time 9-5-67 Weather SUNNY				
	Y MEASUREM parest .01 ft.)		Z vation	feel bean caring Date Time		Method Used (M-Scope Number or Electric Sounds)			r or Other)
WELL EVACU Gallon 7.	18, Pc	ore Volumes	n _pc	Method Used	<u> </u>	Rinse Metho	d, 5-2	?- } 7 Date	, Time 1450 - 152
Surface Water	r Flow Speed			Measurement I	Method		,	ate, Time _	
Sample	Date, Time 9-3-37	Method purshit pump	Volume (ml) <u>500</u> /000	Container Type Poly pely	Depth Taken (feet),	Field Filtered (yes,no)	Preserva- tive	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	pH <u>6.86</u>	Conductivity	Tem 22		·				4
•)1. = 1.	*							
	cond		to n	ensul! c	.CC UC. 1	1-14			j#*
F,	ilter "	metals"	sangi	12 12 1	'a b			 -	,
						· · · · · · · · · · · · · · · · · · ·			
otal # of Bott	les·	<u> </u>	 	<u></u>		Signature	St Al	noha	,



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Field Sampling Data

		78804	, 5410	6.01	Sample Des		UI -9-2 9/3/83	
CLIENT/CONTACT_	Ken John	لده			Weather	SUNA		
HYDROLOGY MEAS (Nearest .0		evation	, Date, T	'As mg	Meth	od Used (M-	Scope Numbe	er or Other)
WELL EVACUATION: Gailons	Pore Volumes		ethod Used	-,	Rinse Metho		Date - 3-ナテ), Time // 00 ^ / 24
Surface Water Flow S	peed	·,	Measurement i	—— Method ——			Date, Time	
SAMPLING:		Val		Depth	Field			0
Sample Time		Volume (ml) _≤oo_	Container Type	Taken (feet) /\$	Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phospha
		1300 250	poly		<u>/N</u>	NaOH		detergent wa H2O rinse MeOH rinse Distilled H2
							·	rinse
161 to 144								
TIELD WATER QUALTI Pore Vol. Number pH	Conductivity	Temp	% Eh			,		
Pore Vol.	Conductivity	Temp						
Pore Vol. Number pH 2, 10.52	Conductivity			-,				
Pore Vol. Number pH 2, 10.52	Conductivity							
Pore Vol. Number pH 2 10.52	Conductivity /6300	15.0		-,				
Pore Vol. Number pH 2 10.57 11.35 OTES:	Conductivity 16300 15200	15.0	-,	-,,,,				
Pore Vol. Number pH 2 10.57 11.35 OTES: fore vol.	Conductivity 16300 15200	15.0	~					
Pore Vol. Number pH 2 10.57 11.35 OTES:	Conductivity 16300 15200	15.0	-,					
Pore Vol. Number pH 2 10.57 11.35 OTES: fole uol water ode	Conductivity 16300 15200 15200 1 = 1.3 column 2 = 1.3 column 3 = - dark 4 = H2S	15.6	~					
Pore Vol. Number pH 2 10.57 11.35 OTES: fole uol water ode	Conductivity 16300 15200	15.6	~					
Pore Vol. Number pH 2 10.57 11.35 OTES: fole uol water ode	Conductivity 16300 15200 15200 1 = 1.3 column 2 = 1.3 column 3 = - dark 4 = H2S	15.6	~					
Pore Vol. Number pH 2 10.57 11.35 OTES: fole uol water ode	Conductivity 16300 15200 15200 1 = 1.3 column 2 = 1.3 column 3 = - dark 4 = H2S	15.6	~					



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Field Sampling Data

PROJECT	NADDRESS NAME <u>W#Y#</u> ONTACT	RACKER /	KI: /	LONG VICY _# 541	01.02	Sample Desi	gnation	or	·: 8>		
HYDROLO	GY MEASUREM Nearest .01 ft.)	AENTS:	evation	Date, Time 11-4 37 0904			Method Used (M-Scope Number or Other)				
WELL EVA	lons P	ore Volumes		ethod Used	-,	Rinse Metho		Date.	, Time		
Surface Water Flow Speed			,	Measurement	-, Method			Date, Time			
Sample A Z	Date, Time	Method	Volume (ml) ことこ	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse		
Pore Vot. Number	pH	Conductivity 888 858	Temp /// 3 // ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Eh				,			
	6AZ /PV										
PEO	CATES	TUBIN	6								
otal # of Bo	Minn	4			· .		2		2 /		



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PROJECT	N/ADDRESS NAME <u>&& YE </u>	CHARCES CL/	CHLORINE A	NGV!(W /-	1.02	Sample Des Date, Time_	ace Site Numb ignation	4-3/11.	4-57
(Nearest .01 ft.)		evation	Date, 1	ime	Meth	od Used (M-S	cope Numbe	er or Other)
	ACUATION:	ore Volumes		ethod Used	-1	Rinse Metho	nd	Date	, Time
Surface Wa	ater Flow Speed	·		Measurement I	Method				
Sample 7-3 A	Date, Time /2:34 /2:35 /2:35	Method		Container Type	Depth Taken (feet)	Field Filtered (yes.no)	Preserva- tive	(yes,no)	Sampler Cleaning Method Non-Phosphati detergent was H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	pH 6.20 6.34 6.37	Conductivity SS20 SS00 SHBS	Temp	3, 2,					
				MSL				NEC	
	Ince		7.2.0						
FEP	CATRO .	TUE 1.1'			 _				
							· · ·		
· · · · · · · · · · · · · · · · · · ·	4		 		·		1		
lal # of Bot	tles:			·		Signature:_	a.	_ ~	SEA-400-0



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PROJECT	N/ADDRESS NAME ONTACT		c Kionn g	2/.8 2	Well or Surface Site Number Sample Designation Date, Time Weather SUFFICES Weather				
(GY MEASUREM Nearest .01 ft.) (ク, 38	Ele	evation	Date, T		Method Used (M-Scope Number or Other)			
WELL EVA	ions Po	ore Volumes	<u>/</u> //	Method Used			Rinse Method Date, Tin		
Surface Wa	urface Water Flow Speed			, Measurement Method			Date, Time		
Sample	Date, Time // / / / / / / / / / / / / / / / / / /	Method)? when y	Volume (mi) 2.777	Container Type	Depth Taken (feet)		Preserva- tive	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	PH S.42 5.56	Conductivity 13,760 13,760	Temp 19-7 19 5	<u>-</u> '	-,				
1,9 01c :	CALS /	P. V TUBING							



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PROJEC	T NAME WEY	CLHORELY C	HLORINE	1 6×60/810	1.02	Well or Surface Sample Design	nation^		
CLIENTA	CONTACT					Weather			
HYDROL	OGY MEASURE	MENTS:							
	(Nearest .01 ft.)	Ele	evation	Date, 1	Time 3 >,	Metho	d Used (M-So	cope Numbe	or Other)
		Pore Volumes	. N	fethod Used	-,	Rinse Method		Date - 4-87	, Time
Surface W	ater Flow Speed	1	1	Measurement	_, Method	· · · · · · · · · · · · · · · · · · ·			
BAMPLIN	 3:						, D	ate, 11me _	
Sample	Date, Time	Method P Pump	Volume (ml) 250	Container Type Poly	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphat
									detergent was H2O rinse MeOH rinse Distilled H2O rinse
ELD WAT Fore Vol.	PH	ESTS:	Temp						
ore Vol. Vumber	рН		/3.9) OFF	SCAL	£_,	,	
Number	рН	Conductivity	/3.9	·	- OFF	SCAL	E _, _	,,	
Pore Vol. Number	pH 1150	Conductivity	/3.9)					
Pore Vol. Number	PH 1150	Conductivity	/3.9	·				FILL	
Pore Vol. Number	PH 1150	Conductivity	/3.9)				Fill	
Pore Vol. Number	PH 1150	Conductivity Conductivity	/3.9)				FIEC	
Pore Vol. Number	PH 1150	Conductivity Conductivity	/3.9)				FILE	



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Field Sampling Data

PROJECT	NIADDRESS NAME ONTACT	MASSA /	Cloring	. 54/0/	٠٥٤_	Well or Surface Site Number Transaction Country Sample Designation Francisco Country Date, Time 1/64 - 87 Weather				
	PGY MEASUREM Nearest .01 ft.)		evation	Date, 7	Date, Time Method			Used (M-Scope Number or Other)		
WELL EVA		ore Volumes	Method Used			Rinse Metho	d	Date, Time		
Surface Wa	ater Flow Speed							ate, Time		
Sample Sample	Date, Time //- 9 /305,	Method P'Pur P	Volume (mi) 2.50	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	(yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O	
Pore Vol. Number	pH	Conductivity	Temp		-,		· · · · · · · · · · · · · · · · · · ·			
OTES:							 , -	•		
72A	NSPER From	BLANK K-N-	<u>سی یں</u> حریمای	e pr	57.480	WA7	Co	ARCH	1560	
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atel # of Bot	· · · · · · · · · · · · · · · · · · ·						(in		<u></u>	



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LOCATH	ON/ADDRESS _	LAYECO	CI	CRINE			ace Site Numb		
FACUEC	/ NAME	<u> </u>				Date, Time_	1-12-88		v-1 / 4.2
						. Weather	OVENCE	x 7	
HYDROL 5- /.2,	OGY MEASURE (Nearest .01 ft.) 8.79	Ε	ilevation	Date, 1	Time /-/2	Metr M Scc.	od Used (M-S	cope Numb	er or Other)
	ACUATION:	Pore Volumes							
			. <u>Pe</u> z	lethod Used UFALT L MIG.					
Surface W	Vater Flow Speed	' 		Measurement I	Method		,	ate, Time _	
SAMPLIN			Volume	Container	Depth	Field			Sampler
Sample ./- / w-2.	Time (-0.5% //0.	Method	(ml)	Type Pal Y	Taken (feet)	Filtered (yes,no)	Preserva- tive	lced (yes,no) ·/,	Cleaning Method Non-Phosphati
									detergent wasi H2O rinse MeOH rinse Distilled H2O
	 ,					_• -			rinse
Pore Vol.	PH	Conductivity	Temp			-			
	7.35	441			-,				
NOTES:									
	1.8 GALJA		011	100-00 -					
	Y								
									
									
 -			-						
				·					
/di # 01 50t						Signature:			084 445
							•		SEA-400-01



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Field Sampling Data

PROJE	ON/ADDRESS CT NAME CCONTACT		CLORI			Sample Des Date, Time_	ace Site Numb ignation	er Mus	MW- 4 w-/w-
HYDROI	LOGY MEASUREN (Nearest .01 ft.) 9. 26		evation	Date, 1	ime /2 30	Method Used (M-Scope Number or Other)			
	VACUATION: ialions Po	ore Volumes	رور .	lethod Used	-,	Rinse Metho	d	Date	, Time
Surface V	Water Flow Speed			Measurement I	_, Method		,	ate, Time _	
Sample Sample Yw 4/b	Date, Time /3 03 /-/7-68	Method P I m P	Volume (mi) 	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	(yea,no)	Sampler Cleaning Method Non-Phosphatik detergent wash H20 rinse MeOH rinse Distilled H20 rinse
Pore Vol. Number	pH G77 G77	Conductivity GET SCALE ''	Temp /2.7 /2.5	_,					
NOTES:	GAL PV								
					<u>. </u>				
Total # of B	ottles:					Signature:_	- :		



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Field Sampling Data

	N/ADDRESS _	WELLEN.	HA C	locall.	·	Comple De-	ace Site Numi	oer <u>/74</u> w~5 /	<u>r3</u> w-1 w.2
CHEVECT	NAME					Date, Time	1-12-88		4-1 W. Z
CLIENIA	ZONTACT					. Weather	OMR CAS	7	
HYDROLO	OGY MEASUREN	MENTS:			·				
	(Nearest .01 ft.)		vation	Date, T	ime	1.4 - Ab			
	8.93			777-8	13:50	Metn // 5/	od Used (M-S		
		 -							
WELL EVA	ACUATION:								
	llons Po	ore Volumes	м	lethod Used		Dinne Mark			
	<u>^</u> , <u>2</u>	<u> </u>	P	ouni?	-•	Rinse Metho	d 		o, Time ≈
Surface Mi	,				-,				
Surface W	ater Flow Speed			Measurement R	Method				
SAMPLING	A:								
					Depth	Field			
	Date,		Volume	Container	Taken	Filtered	Preserva-	land	Sampler
Sample	Time	Method	(mi)	Туре	(feet)	(ves.no)	tive	(yes,no)	Cleaning Method
1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14:00 1-12 AD	Prom	رجب ,	POLY'		Yes		<u>بحرد .</u>	Non-Phosphatic
				· · · · · · · · · · · · · · · · · · ·				 ,	detergent wash
					 ,				H2O rinse
						 , .			MeOH rinse Distilled H2O
		•	 -						rinse
	,							-, <u></u> ,	
FIELD WAT	ER QUALITY TE	ST&							
Pore Vol.									
Number	4 PH	Conductivity OF SCALE	Temp _2, 2/_						
<u></u>	520	<i>""</i>	<u> </u>	-			 , .		
3	5.20		12-			 -	 , -		
							 , .		
				-,	-,				
OTES:									
	1.								
1.8 Jay	pr/								
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22.	fill SAL	INA							
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									_
		_							
									
									
									
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LOCATION/ADDRES					Sample Des	ace Site Numb ignation		1200
PROJECT NAME CLIENT/CONTACT_					Date, Time_ Weather	1-12-88 OVER.	51	
HYDROLOGY MEAS	UREMENTS:							
(Nearest .0		Elevation	Date, 7	ime '/30	Meth	od Used (M-S		er or Other)
WELL EVACUATION: Gailons	Pore Volumes	برم .	Jethod Used	-1	Rinse Metho	d	Date	, Time
Surface Water Flow S	peed	_·	Measurement (, <u></u>		
SAMPLING:								
Sample Time		Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive N/a	(yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O
								rinse
FIELD WATER QUALF Pore Vol. Number pH 1, 7.34 2, /0.58	Conductivity	7 Tem; /2,6	,				,	
* 1.5 GAL	/ev							
	OPMON:	LUPUT	MAMY					
		· · · · · · · · · · · · · · · · · · ·						
	·				-			
	·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·					
otal # of Bottles:	· · · · · · · · · · · · · · · · · · ·				Signature:_		·	SEA-400-01



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Sweet, Edwards & Associates, Inc.

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				ion. Fra		Sample Desi	gnation	4W-3	USFER BLA
						•	1-12-88		
						Weather	30272	15	
	OGY MEASUREN (Nearest .01 ft.)	Ele	evation —	Date, T	ime				
Ga		ore Volumes		ethod Used	-,	Rinse Metho		Date	, Time
Surface W	ater Flow Speed			Measurement I	-, Method				
Sample	Date, Time 1-12-€8	Method Par,	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphati
<u> </u>									detergent was H2O rinse MeOH rinse Distilled H2O rinse
Number	рН 	Conductivity	-,		-•		 1 -		
OTES:	TRANS	er Bla							· .
ital # of B	Ottiea:			·	<u> </u>	Signature:			
_	<u></u>								SEA-400-



Kelso, WA (208) 423-3580 Redmond, WA (208) 881-0415

LOCATION/ADDRESS	CHLORINE PL		Well or Surface Site Sample Designation Date, Time3-7	4.2	
PROJECT NAME			Weather PACTUS	COUPY	
HYDROLOGY MEASUREMENTS:	evation Date, T	ime /Z:15	Method User	d (M-Scope Number	or Other)
WELL EVACUATION: /.8 GAL/PV Gallons Pore Volumes Gallons T	Method Used	,	Rinse Method		12: 12:
Surface Water Flow Speed	, Measurement	Method		, Date, time	
Date, Sample Time Method 775741 3-7-88 (737) PHT (040 3-7-89 1734	Volume Container (ml) Type 500 POLY	Depth Taken (feet) >/s/		serva- iced ive (yes,no) /£5	Sampler Cleaning Method Non-Pheephatis detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Number pH Conductivity 1 6.53 655 2 630 630 3 695 659	Temp Eh /4.5				
DEDICATED TO	BIN 6				
					•
			•		-31
Total # of Bottles:			Signature:	fre ;	Brule



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LOCATION: PROJECT N CLIENT/COI	AME	MIECO.	CH	CORINE		Data Time	nation W-	7	-2
(N	Y MEASUREMEN earest .01 ft.) /3		ation,	Date, Ti	me // 05,	Metho ACTAT	d Used (M-Sco	ope Number	or Other)
WELL EVAC Gallo	ons Pore	1.7 CAL / PL Volumes	PM	ethod Used		Rinse Method		7-88 .	Time BL6 W 1.53 Cio /1:53
Surface Wat	er Flow Speed _		,	Measurement N	Aethod	<u> </u>	, Da	ate, Time	
Sample Sample MCTHS	Date, Time 3-7-9 //	Method	Volume (ml) 500, 250,	Container Type POLY POLY	Depth Taken (feet)	Field Filtered (yea,no) Y f.s.	Preserva- tive	ced (yes,no) 	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse Distilled H2O rinse
Pore Vol. Number	pH	Conductivity	Terr	np Eh					
NOTES:									
DEO	BLACH PICATRA					÷	:		
							· Lor		



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Field Sampling Data

PROJECT NAME				·	contibie nes	Ignation 4	7-5	
CLIENT/CONTACT			#			3-7-88		
					Weather_P	util (LOWY	
HYDROLOGY MEASUREM	IENTS:							
(Nearest .01 ft.)_	Ele	evation	Date	, Time	Meth	od Used (M-	Coope N.,	O.b
10.15	<u> </u>		<u>3-7-88</u>	19:02	ACTAT	\$ 00 000 (min	scope Munic	per or Other)
				 ,				
1421 214 214 214	1/							
WELL EVACUATION: Gallons Pr	1.6 646/							
\sim 3	ore Volumes		Nethod Used	-	Rinse Metho		Dat	e, Time
<u> </u>			Part	,	4 Berov	<u>ک</u> ,	-7-88	
Surface Water Flow Speed		· —		 ,				
			Measuremen	it Method		 ,	Date, Time	
SAMPLING:								
				Donth	6 1.1.4			
Date.		Volume	Container	Depth Taken	Field	0	_	Sample
Sample Time	Method	(mi)	Type		Filtered	Preserva-	iced	Cleanin
TAL 3788 14:30	p purp	600	70	(feet)	(yes,no)	tive	(yes,no)	
A (COND 11 1432		250	Post	18	<u>//o</u>		-	Non-Phosp detergent
		 ,		-, - , - ,	70 ,			\ H2O rin
							-, ,	in HOeM
	•	 ,			 ,		-	Pistilled I
					 .			rinse
		 ,			 , .		_,,	_
IELD WATER QUALITY TE Pore Vol. Number		T						
	STS: Conductivity	Tem;	p Eh					
Pore Vol.		Tem	p Eh					-
Pore Vol.		Tem	p Eh					
Pore Vol.		Tem	p Eh					
Pore Vol.		Tem	p Eh					
Pore Vol. Number pH		Tem	p Eh					
Pore Vol. Number pH	Conductivity		p Eh					
Pore Vol. Number pH			p Eh					
Pore Vol. Number pH	Conductivity							
Pore Vol. Number pH	Conductivity							
Pore Vol. Number pH Contract Contr	Conductivity	PILE						
Pore Vol. Number pH Contract Contr	Conductivity	PILE		use 'E	ann sou	s 14:	Y Drocos	
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF	Conductivity Table SALT CATEA	PILE		use	ALON BOU	s /4:	YOROLOG	<u> </u>
Pore Vol. Number pH Contract Contr	Conductivity Table SALT CATEA	PILE		us & &	anonsou	s //	Y Onolos	
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use	anon Bou		YPROLOG	y
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF	Conductivity Taba	PILE	INT CA	use :	ALON SOU	s /4:	YOROLOS	<u> </u>
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use	Asonsou	s /4:	Y Onolos	<u> </u>
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use E	anonsou	s //*	Y Onolos	<u> </u>
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use e		<i>s</i> //*:	YOROLOG	Y
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use E	anon sou.	s //*	Yonolos	
Pore Vol. Number pH Contest Dlacme NUM SALINITY OF MASSILLAMENTS	Conductivity Taba	PILE	INT CA	use e	nonsou	s //=:	Yanolos	
Pore Vol. Number pH Contest Dlacker NUMAN SALINITY OF MASSILINATY S	Conductivity Taba	PILE	INT CA	use	anon Bou	<i>s</i> //*:	YPROLOG	y



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LOCATION/ADDRESS	CHLO			Sample Desi	unation	T MI	0 - 4
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.) /3. 96	Elevation	0ate, Ti 3-7-88	me 12 00,	Method TAT	od Used (M-Sc		or Other)
WELL EVACUATION:).664L// Gallons Pore Volumes	M	lethod Used		Rinse Metho		7-8 Date,	26m 1305
Surface Water Flow Speed	,	Measurement N	Method		, Da	ate, Time	
Date, Sample Time Method AL 3-7-88 (320 P Pum Cano, 3-7-88 (322 P Pum		Container Type Ably Ably	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	ced (yes,no) 	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number pH Conductivi	ty Tem		-,				
NOTES: W-3 B CL. EQ PH & CONDUCTOUS							
OLOICAMO. TU	·			•		· · · · · · · · · · · · · · · · · · ·	
Total # of Rottles				01	. Ja		2 do



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LOCATIO	N/ADDRESS	WEVELO	CI	lormh					45fla Bldm
PROJECT	T NAME								
	OGY MEASUREME (Nearest .01 ft.)	Ele	vation	Date, Ti	me	Metho	od Used (M-Sc		·
	ACUATION:	e Volumes	M	ethod Used		Rinse Method	<u> </u>		, Time
 Surface W	/ater Flow Speed			Measurement N	, fethod		, Da	ate, Time _	
SAMPLIN	G:			·	Depth	Field			
Sample MUSALS	Date, Time 3-788 /512 3-789 /513	Method P Punt	Volume (ml) 500	Container Type Poly Poly	Taken (feet)	Filtered (yes,no)	Preserva- tive	iced (yes,no) . <u>Y&S</u>	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse
									MeOH rinse Distilled H2O rinse
Pore Vol. Number	ρH	Conductivity	Tem	p Eh					
NOTES:	4								
		ullo		PAY	- N - PI	AN KA	CSU		· · · · · · · · · · · · · · · · · · ·
		CHASLO		-88					
			<u>.</u>						
Total # of	Bottles:			2		Signature	1	~ 1	nute



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LOCATION/ADDRESS Wey	co Chi	Orine		Well or Surfa Sample Desi	ice Site Numbi gnation <u></u> し	er <u>MW</u> C - 588 -	-1 W1
PROJECT NAMECLIENT/CONTACT				Date, Time_	5.9.88	1001	
				Weather_pa	ertly cloud	y , 60° F	deed win
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.)	Elevation	Date, 1 	îme	Metho (G	od Used (M-So	ope Number	or Other)
WELL EVACUATION: Gallons Pore Volumes 4.8, 3	Ň	/pv lethod Used	-,	Rinse Method	_	Date,	Time
Surface Water Flow Speed		Measurement	Hethod		, Da	ate, Time	
Date, Sample Time Method Met. 1028 - 1031 perists	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	lced (yes,no)	Sampler Cleaning Method
2H	712 <u>500</u>	<u>ρο(γ</u>	<u></u>	<u>N</u>	=======================================	-, y , y ,	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number pH Conductivity 1 6.3c 600 µ 2 6.79 562 3 6.88 542	Tempular /0.9	_;					
TES:		duglicate	and to	Way (a	ra liha		
clear water,				floatin			\$
weyco split & c	'As split	4 set	in eve	evetion			
						/8/	
						. /86 M	
al # of Bottles:				Signature	All	WI	
•				o.Aerni.er	V	"	8-E/E 400-0



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LOCATION/ADDRESS	Wey Co		hlorine		Well or Surfac	se Site Numb	er	
PROJECT NAME			#		Date, Time		1136	
CLIENT/CONTACT					. Weather		zy (wrish	le) 60°F
HYDROLOGY MEASUREME	NTS:							
(Nearest .01 ft.) 9.07	Ele	vation	Date,	Time	Method 7GA	d Used (M-S	cope Numbe	er or Other)
WELL EVACUATION: Gallons 7.6 Pore	Volumes.		fethod Used Pristaltic		Rinse Method	,	//59 ^{Date}	, Time
Surface Water Flow Speed			Measurement	Method			ate, Time _	
SAMPLING:				Denth	Field			
Sample Time 1263-1204	Method Porist with a	Volume (mi) <u><000</u> 25b	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva-	ced (yes,no) 	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
2 6.63 Z	Sonductivity Sob Up hay 8 200' 6 200 5 000	Temp (0.5) (0.2) (0.0)					,	
OTES:				· · · · · · · · · · · · · · · · · · ·	<u> </u>			 ·
	lear m	oderate	sulfur	odx v	o sediment		٠	
	5/16 m	Buich	tint sh	LUL				
	Johnson		-	<i>4111/</i>	bamy			<u> </u>
	- 111-	1-070	FFIADSCT			· · · · · · · · · · · · · · · · · · ·		
							 .	
								·
								
							204.4	1400
lai # of Bottles: 8						JJM,	186M.	<u> </u>
tal # of Bottles;			<u> </u>		Signature:	Hal	-14/)	8-E/E 400- 01



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LOCATION/ADDRESS	<u> Ne</u> y	co Ch	lorine		Well or Surfa	ace Site Nu	mber <u>M</u> WC - 589 .	W-1 3
PROJECT NAME					Date, Time_	5.9.88	1219	- W -
CLIENT/CONTACT			7		Weather		bree by	550 F
HYDROLOGY MEASUREMEN (Nearest .01 ft.)		ation	Date, T	ime 126	Meth	od Used	-Scope Numb	er or Other)
WELL EVACUATION: Gallons 7 Pore	2.º ≰ Volumes		lethod Used	-ı	Rinse Metho	d 2	1245 Date	9, Time
Surface Water Flow Speed			Measurement I	 Method		 , -	Date, Time	
SAMPLING:								
Date, Sample Time 1249 - 1250	Method Parishelik	Volume (ml)	Container Type	Depth Taken (feet) /5	Field Filtered (yes,no)	Preserva tive	・ lced (yes,no)	
		ZÍD.			<u>~</u>			Non-Phosphatic detergent wash H2O rinse MeOH rinse
 ,								Distilled H2O rinse
5.78	onductivity (c. 800 Mm/s 36 100	7 Temp 11.6 11.7	06			,		
OTES:	nod	erate p	product odo	r , sal	ły , cle	ear , 10	or less	
	·					···	JJM/861	Υ
tal # of Bottles:	2	- 			Signature:_		JJM/861	
						•	•	8-E/E 400-0



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LOCATIO	ON/ADDRESS	Weyca	· CAI	orine			ace Site Numb		J-1 4
PROJEC	T NAME					Sample Desi Date, Time_	S·9·88	1052	- w3
CLIENT	CONTACT				 _	Weather	bree	zy Warie	be 60° F
HYDROL	OGY MEASUREME (Nearest .01 ft.) j4 .02		evation	Date, T	ime	Metho P&M	od Used (M-S	cope Numb	er or Other)
Ga 	ACUATION: Allons Port Actor Flow Speed	Volumes	<u></u>	py lethod Used existaltic		Rinse Metho 45 belo	<u>~</u>	Date //20), Time
SAMPLING				Measurement I	Method		, D	ate, Time _	
Sample Mer .	Date, Time 125 - 1/30	Method Paristrific	Volume (mt) SDO 256	Container Type foly	Depth Taken (feet) /4	Field Filtered (yes,no)	Preserva- tive	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	3.88 8.77	Conductivity i901 jun 2600 4600	7.6 9.6 9.4 9.4	<u> </u>					
IOTES:	· ·	sulfur , form)		derk slight ord	inge - t	prown color			
·									
							/ייע	PHM ('KJ
otal # of Bo	ttles:					Signature:_	Un/	MX	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

	ON/ADDRESS		yeo ihl			Well or Surf	signation	NC - 588.	where site
CLIENTA	CONTACT					Weather	5.9.68 breezy	1348 1550 F	
	OGY MEASUR (Nearest 01 f		levation	Date,	Time	Meti	nod Used (M-S		er or Other)
	ACUATION:	Pore Volumes		Method Used	_,	Rinse Metho	od .		a. Time
Surface W	ater Flow Spec	ed		Measurement	_, Method		 ,		
Sample Mc1.	G: Date, Time	Method .	Volume (ml) 	Container Type	Depth Taken (leet) Surface	Field Filtered (yes,no)	Preserva-	lced (yes,no)	Sampler Cleaning Method Non-Phospha
						<u> </u>	-	-, Y ,	detergent was H2O rinse MeOH rinse Distilled H2O rinse
	TER QUALITY	TESTS:							-
Pore Vol.	PH 7.75	Conductivity	Temp	<u>-1</u>	_,			,	
Pore Vol. Number	PH 7.75,	Conductivity 783 Hal		<u>-</u> :	-,,,			,	
Pore Vot. Number	PH 7.75,	Conductivity		<u>-</u> :	-,,,			,	
Pore Vot. Number	PH 7.75,	Conductivity 783 Hal		<u>-</u> :	-,,,			,	
Pore Vol. Number	PH 7.75,	Conductivity 783 Hal		<u>-</u> :	-,,,				
Pore Vol. Number OTES:	PH 7.75,	Conductivity 783 Hal		<u>-</u> :	-,,,			J~/961	4



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PROJEC		Wey. W. Chlorine				Well or Surface Site Number Sample Designation Date, Time Sequence Site Number Date, Time Sequence Site Number WC - 588 - W 1 Date, Time Sequence Site Number of Other) ACTAT ASD			
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.) N/T			evation Date, Ti						
		re Volumes		lethod Used		Rinse Method	5-9-88 Date, Time		
Surface W	ater Flow Speed			Measurement Mo	ethod		, Da	ite, Time	
Sample Mat	Date, Time 5-9 // // // // // // // // // // // // //	Method paristulair	Volume (ml) 500 250	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	ced (yes,no) 	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	pH	Conductivity	g q Temp	En					
IOTES:	= /a' /	nom J	MTKA	LINE		· · · · · · · · · · · · · · · · · · ·	·		
-									
-								m/8/	. مر
otal # of Bo	ottles:	3				Signature:	¥.	1/96 L 7	13)



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PROJECT		We				Sample Des	5.9.88	1516	- Y - w7 2/y wind <
(1	GY MEASUREI Nearest .01 ft.)		ration,			Meth	od Used (M-Sc		
WELL EVA		Pore Volumes	Me	ethod Used	-1	Rinse Metho	ď	Date	Time
Surface Wa	iter Flow Speed	·		Measurement N	dethod		,	ate, Time _	
SAMPLING Sample	Date, Time	Method ,	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method Non-Phosphal
			<u> </u>		,			-	detergent was H2O rinse MeOH rinse Distilled H2O
Pore Vol. Number	6.94	Conductivity		<u> </u>				,	
NOTES:	wate nome v	odorless	col	brless whe	n Silter	ed			
-					··········				
						•			
							And	PGM/J	JM



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Field Sampling Data

8-E/E 400-01

LOCATION/ADDRESS _	ve	y. Lo.	Chlorine		Well or Surf Sample Des	ace Site Numb	· ————————————————————————————————————	-Z
PROJECT NAME					Date, Time_	5.9.88		<i></i>
CLIENT/CONTACT					Weather	breez) 55°F
HYDROLOGY MEASUREN	MENTS:							
(Nearest .01 ft.) 		vation	Date, 1	rime	Meth	od Used (M-S	cope Numbe	er or Other)
WELL EVACUATION:			-					
	ore Volumes		fethod Used	_ ,	Rinse Metho	d	Date	, Time
Surface Water Flow Speed			Measurement	—— Method ——		,	ate, Time _	
SAMPLING:						,		
Date, Sample Time	Method perishalik	Volume (ml) <u>Såb</u> ,	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva-	iced (yes,no)	Sampler Cleaning Mathod
							-	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
FIELD WATER QUALITY TE Pore Vol. Number PH 7,	Conductivity	Temp	Eh Eh			,		
OTE S:	odorless,	colorles	s (filher	ed)		-		_
10 From w	ATEL LINE			<u></u>				
								
								-4
				·				
					•			
· · · · · · · · · · · · · · · · · · ·								
				·		V W.C	PEM	
tal # of Bottles:	L.				_ Signature:_	JSM/	WS	



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LOCATIO	N/ADDRESS	<u>u</u>	ley. Lo	Chlorine		Well or Surfa	ace Site Num	ber	Transf
CLIENTIC	NAME					_ Date, Time_	5.9.82		
						- Weather	54	· E	<u> </u>
	OGY MEASUREM (Nearest .01 ft.)	Ele	vation	Date, T	lme	Meth ACT17	od Used (M-	Scope Numbe	er or Other)
	CUATION:	re Volumes		lethod Used	-1	Rinse Metho	d <i>ಀ</i>		, Time
Surface Wa	ater Flow Speed			Measurement N	.,				
SAMPLING);		·			 			
Sample UST	Date, Time	Method Paristalkia	Volume (ml) 	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva-	lced (yes,no)	Sampler Cleaning Method Non-Phosphatic
							·		detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number	PH	Conductivity	7 Temp	Eh	-,				
OTES:		- "	-						
Th	esselv	BLANK							
			······································						
								-	
	· · · · · · · · · · · · · · · · · · ·						77	~ 186 M	\ .
tal # of Bott	tles:				 	Signature:_	41	-Mix	
								•	8-E/E 400-01



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PROJECT NAME	-ongriew, WI	a Takasan			Date, Time_	gnation WC	8 113	
IYDROLOGY MEASUREM (Nearest .01 ft.) 9.29		vation	Date, T	ime	Metho PG A	od Used UM So	ope Numbe	·
VELL EVACUATION: Gailons Po	ore Volumes	i . C - G Me — β-	thod Used	.,	Rinse Method		Date //42	, Time
urface Water Flow Speed			Measurement N	nethod		, Da	ate, Time _	
Date, Sample Time o 145	Method Perist.	Volume (ml) 240 	Container Type Pbly	Depth Taken (feet) 15	Field Filtered (yes,no)	Preserva- tive	(yes,no)	Sampler Cleaning Method Non-Phesphatic detergent wash H2O rinse MeOH rinse Distilled H2O
ELD WATER QUALITY TE fore Vot. Number pH 1 5.55 2 5.43 3 (0.24)	Conductivity 937 pt 1020	Temp 15 15 15.5	Eh					
TES:	hear	. ded:	() Tu	<u> </u>		····•		
	rew away		ved 149	04	Υ	t duplier	le labe	led
						oc -788		
				<u> </u>	٠ ٢٠.			
					- <u>-</u> -			



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	GY MEASUREM Nearest .01 ft.)	e l	levation	Date, Tir		Method	Used (M.Sc	ope Number	or Other)
	CUATION:	ore Volumes	1.6.9/J	ethod Used		Rinse Method		Date,	Time 5
Surface Wa	iter Flow Speed			Measurement M	lethod		, Da	ate, Time	
Sample	Date, Time (よの)	Method Oerist	Volume (ml) 250 500,		Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	ced (yes,no) 	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
	ER QUALITY TI	EST&:							 ·
Pore Vot. Number	PH 91	Conductivity 486091 41800 39800	Temp //w //5 //5		-1			,	
Pore Vol.	6.97 6.97	Conductivity 4860911 41800 39300	, <u>/5</u> , <u>15</u>		-1				·)
Pore Vol. Number t)	6.97 6.97	Conductivity 4860911 41800 39300	, <u>/5</u> , <u>15</u>		-1		₩ Pr	r lou	led wz - 78
Pore Vol. Number t)	6.97 6.97	Conductivity 4860911 41800 39300	, <u>/5</u> , <u>15</u>		-1		,	r lebel	led wz - 78
Pore Vol. Number t)	6.97 6.97	Conductivity 4860911 41800 39300	, <u>/5</u> , <u>15</u>		-1		,		
Pore Vol. Number t)	6.97 6.97	Conductivity 4860911 41800 39300	, <u>/5</u> , <u>15</u>		-1		,		



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LOCATION/ADDRESS	Wey	. Co. Ch	lorine			ice Site Numbr gnation いと		•
PROJECT NAME					Date, Time_	7758	1240	_
CLIENT/CONTACT					Weather		same d	MW-4 80°
HYDROLOGY MEASUREM (Nearest .01 ft.)		vation	Date, T / 2.4 S	ime 	Meth-	od Used (M.Sc		or Other)
WELL EVACUATION: Gailons	ore Volumes		hod Used			d 		
Surface V-ater Flow Speed		, 1	Measurement I	Method				
SAMPLING:		Volume	Container	Depth Taken	Field Filtered	Preserva-	lcedi	Sampler
Sample Time 1305 Met 1305	Method per st. fu-p	(ml) 250, 500,	Type poly	(féet)	(yes,no)	tive	(yes,no)	Cleaning Method Non-Priosphatic detergent wash H2O rinse MeOH rinse Distilled H2O
FIELD WATER QUALITY TO Pore Vol. Number 7.44	ESTS: Conductivity	Temp 2) 2	Eh					
² 7.16		19.5						
NOTES:	orless sal	H	d		l dedicate	, A.	. labele	ملا له
	oriess sai	Py smell			750~		-788 - W	
** >	largest co	-ductivity	1hal					
	meter can				11	1.		
	off eve	ry scale			 			
Backu	p meter	corldi	t read	conduct	hivity ei	ther		
								
3						An	1/4	<u> </u>
Total # of Bottles:					Signature:	X/24	-M+)	0 500 00



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LOCATION/ADDRESS PROJECT NAME CLIENT/CONTACT		s	Vell or Surface Site N ample Designation ate, Time	<u> 10 - 10 - 103 - </u>	*
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.)	Elevation Date, 1	Fime	Method Used (V-Scope Number or Other)	
WELL EVACUATION: Gallons Pore Volumes	Method Used	Ri	nse Method	Date, Time ルク3	
Surface Water Flow Speed	, Measurement	Method		Date, Time	
Date, Sample Time Method Life Prys		Depth Taken (feet) (1 - 1 - 1	Field Filtered Present (yes.no) tive	(yes,no) Meth	ning nod sphatic it wash inse // rinse //
FIELD WATER QUALITY TESTS: Pore Vol. Number pH Conductivi	ty Temp Eh Eh	-,			
HOTES:					<u>-</u>
<u>, , , , , , , , , , , , , , , , , , , </u>	me visible particular into the less raig 3rd page vulumes	tes	.	Sep labeled a	210
otal # of Bottles:			Signature:	1 W.	



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LOCATION/ADDRESS _	ω_e	u.lo.	Alerine		Well or Surfa Sample Desi	ice Site Numbe anationస	7 38 -	
PROJECT NAME					Date, Time7 -7 -88 /:-05			
CLIENT/CONTACT					Weather		sme	NW-1
HYDROLOGY MEASUREM (Nearest .01 ft.) 나나. 니		ation	Date, Ti	lme		od Used MTSc		or Other)
WELL EVACUATION: Gailons P 3	ore Volumes	1.4 M	ethod Used	ρ	Rinse Metho		Date,	
Surface Water Flow Speed			Measurement N	dethod		, Da		
Sample Time	Method perist perist	Volume (ml) 750 ———————————————————————————————————	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	ced (yes,no) 	Sampler Cleaning Method Non-Phosphati detergent was
								H2O rinse MeOH rinse Distilled H2O rinse
Number pH 	Conductivity 2820	- 13 - 13	Eh	·	,			
NOTES:								
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slight 1	t. brown	streng	eultur od	br		/sbc,		-788 - W
314 314 ox	Atly Gamy	LK. Bro.	-ish			1 4		
	Coffee	color				- + - '9		······································
	 						·	
	2					TL 1	1 7	h
otal # of Bottles:					Signature:	- Yel	/ / /	8-E/E 400-4



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LOCATION/A PROJECT NA	-			Chlorine		Sample Des	gnation	c- 781		
						Date, Time_ Weather	778			
	MEASUREM trest .01 ft.) い / 舟	Ele	evation	Date, T	ime	Meth	od Used (M-Sc	Date, Time Cod Cleaning		
WELL EVACU	B Po	ore Volumes		ethod Used	-,	Rinse Metho				
Surface Water	Flow Speed			Measurement I	-, Method	 <u>-</u>	 ,			
SAMPLING: Sample	Date,	Method	Volume (mi)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive		Cleaning	
MAL.	1330	perist,	<u> </u>		~/A	<u>, x</u>		- y .	Non-Phosphatic detergent wash H2O rinse H MeOH rinse d Distilled H2O	
FIELD WATER Pore Vol. Number	PH.	STS: Conductivity	Temp) Eh						
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						·				
otal # of Bottles	3 :	2			· · · · · · · · · · · · · · · · · · ·	Signature:_	Arl	Ju.	9.E/E 400.04	



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Field Sampling Data

S-E/E 400-01

LOCATION/ADDR PROJECT NAME_ CLIENT CONTACT				Works		Sample Desi Date, Time_	ace Site Number				
(Nearest	VDROLOGY MEASUREMENTS: (Nearest .01 ft.) 10 . 24		ation	Date, 1203	Time	(Meth	od Used (M-S	M-Scope Wumber or Other)			
WELL EVACUATIO		Volumes	M	lethod Used Cイパオムト		Rinse Method	d	Date	, Time		
Surface «Vater Flow	Speed _			Measuremen	 I Method		, D	ate, Time _			
Da Samp e Tin		Method たい、ず、 「いって、	Volume (ml) :50 500	Container Type Pb'	Depth Taken (feet) 18-20	Field Filtered (yes,no)		(yes,no)	Sampler Cleaning Method Non-Phosphatid detergent wash H2O rinse MeOH rinse Distilled H2O rinse		
Number ph	<u>4!</u> ,	\$1500 41300 41300 41300	Temp Ly S i d 1 y		510-A		Pup	- u	vc- 7?8 -		
	<u> </u>	ght Si	Ity od	01				19.	<i>₩</i> 1155		



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LOCAT CNIADDRE			POLINE		Well or Surfa Sample Des		10 2 3 C	17W-5
PROJECT NAME _ CLIENT CONTACT	···-				Date, Time_			
					Weather		*/¢ 30	2 1. Viv 2
HYDROLOGY MEA		Elevation	Date, 1	'ime	Meth P 6 10^	od Used (M [.] S	cope Number	er or Other)
WELL EVACUATION Gallons	Pore Volumes		ethod Used		Rinse Method	·	/25 \\ \	
Surface Water Flow	Speed	,	Measurement	Method		, D	ate, Time _	
SAMPLING:		M-1		Depth	Field		-	Sampler
Sample Tim	Method	· ?50	Type	Taken (feet) 18 - 20	Filtered (yes,no)	Preserva- tive	(yes,no)	Cleaning Method Non-Phosphatic detergent wash
								H2O rinse S MeOH rinse S Distilled H2O rinse
Pore Vol. Number pH	Conductiv	Temp						
)TES:	\$\$ 6'e 1</td <td>· DSPH-</td> <td>. 3</td> <td></td> <td></td> <td></td> <td>* 5cp</td> <td>= w - 50r</td>	· DSPH-	. 3				* 5cp	= w - 50r
	inta >							1240
		leur, voc	darkte sa	14% odor			-19	
al # of Bottles:	3				Signature:	11	1/1.	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATIC NADDRESS PROJECT NAME CLIENT/CONTACT				Well or Surface Sample Design Date, Time	nation 13	6 - 5 - 5	W-4 52 k
HYDROLOGY MEASUREMEN Nearest .01 ft)	TS: ¿ / u)	Date, T	ime	Metho S'(; !	d Used (M-Sc	ope Number	or Other)
	Volumes 3	Method Used	-	Rinse Method		Date,	Time
Surface Vilater Flow Speed		, Measurement I	Method		, Da	ite, Time	•
SAMPLING: Date, Time	Method (n	ume Container ni) Type ; (i) , (i) , (j)	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	(yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
<u> </u>	onductivity 3 4 M 10 500	73					
	press, 5 tre.	- a selfue od	be - 0	du.	.*		
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otal # cf Bottles:	1			_Signature:_	Hai	· */. 4	S-E/E 400-01



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

Fleid Sampling Data

S-E/E 400-01

LOCATION/ADDRESS PROJECT NAME CLIENT/CONTACT			Chlorine		Sample Des Date, Time_	ace Site Numb ignation \$\frac{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi}\tiny{\chi_{\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi}\}\chi_{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi_{\chi_{\chi_{\chi}\tiny{\chi_{\chi_{\chi\tiny{\chi_{\chi_{\chi}\tiny{\chi_{\chi}\tiny{\chi_{\chi\tiny{\chi\tiny{\chi\tiny{\chi\tiny{\chi_{\chi\tiny{\chi\tiny{\chi\tiny{\chi}\tiny{\chi}\tiny{\chi}\tiny{\chi}\tiny\tiny\tiny{\chi\tiny{\chi}\tiny\tiny\tiny\tiny\tiny\tiny\tiny\tiny	1225 44.00	5 - WS
HYDROLOGY MEASU Nearest .01		levation	Date, T	ime	Meth	od Used (M-S	cope Numbe	er or Other)
WELL EVACUATION: Gallons	Pore Volumes	·•	lethod Used	-,	Rinse Metho	-		, Time
Surface Water Flow Sp	eed		Measurement I	—— Method ——				
SAMPLING: Date, Sample Time 12:	Method Frist	Volume (ml) 	Container Type PRIV	Depth Taken (feet)	Field Filtered (yes,no) 12 - y',	Preserva- tive		Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
Pore Vol. Number pH	Conductivity	Temp		-,				
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tal # of Bottles:	ン				Signature:_	And	Yo	

APPENDIX C

CHAIN OF CUSTODY FORMS

veet, Edwards & Associates, Inc. Keiso, WAY 2089 22 580

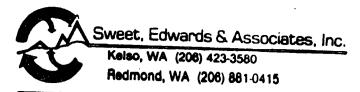
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PROJECT CLIENT INFO		1			ANA	LYSIS	REQU	ESTED		Ţ	-	+ +	, ;	,	GENEI (Speci	RAL CH	IEMIST	RY			OTHI (Spe	ER city)			7
TELEPHONE SAMPLERS SIGNATURE	IIs car	£ 19:	PHONE 423 3	S. E. (1)	BASE/NEU/ACID ORGAN. GC/MS/625/8270	ITILE ORGANICS IS/624/8240	HALOGEN ATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDE	X/TCLP METALS	METALS (TOTAL) X - <	TCLP ORGANICS	pH, COND ALK	02. Cl	Ca, Mg, Na, K		-	,				NUMBER OF CONTAINERS	
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PROJECT Weyerhad	ومدور	Chlor	ine 1		ANA	I Veie	REQUI	COTEN									EMIST			PAG	OTHE		. OF	
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SAMPLERS NAME	Well	5	PHONER 423-	3 580	/ACI	ORGA 4/82	TE0		EAR 610	ANIC 9060	ANIC	2	JAL)	NICS		_	×		İ					OF C
SAMPLERS SIGNATURE	Lan	281	PHONER 423-		/NEU	71LE	GENA	200	ATIC	0RG	902	o (e)	S (Ti	ORGA	98	ن 0' د	. Na.					İ		BER
SAMPLE I.D.	DATE	TIME	LAS I.D.	TYPE	BASE/NEU/ACID ORGA GC/MS/625/8270	\$ 8 8	HALOGENATED VOLATILE ORGANICS 601/8010	2 × 2	A POC	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND ALK	NO3/NO2. CI SO4	Ca, Mg.							
1. MW-Z-1A	7-2-1			Soil								×	X					_			_	+	\dashv	
2. MW-Z-ZA	7-21			41								×	X					1			\neg		\dashv	
3. MW-2-3 A	1			11								×	×						_		+	-	+	
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PROJECT Weyerha	ense	-Chlo	<u> </u>		- AN/	ALYSIS	REQUI	ESTED							GENE	RAL CH					OTI	HER		
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SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE GC/N	VOLATILE ORGANICS GC/MS/624/8240	SEA CO	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND ALK	NO3/NO2. CI SO4	Ca. 14g.						[NUMBER OF
1.MW-3-1 A	7-21			50,1								X	~											
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1.MW-3-4 A	· ·			4								4	K											
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1.MW-3-7 A	1)			"								X	1										\dashv	
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SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATI	MALOGENATED VOLATILE ORGANICS 601/8010	HENOI 304/80	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	H CON	NO3/NO2. CI SO4	S NS							UMBER OF CONTAINERS
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Sweet, Edwards & Associates, Inc. Kelso, WA (208) 423-3580 Redmond, WA (206) 881-0415

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SAMPLERS NAME C. CA SAMPLERS SIGNATURE C	en	Cu	1ell-	200	NEU/	LE 0	ENA!	5 Q	15.6	15/9	8 8 8 8	ig g	Cial I	GAN		<u>5</u>	Ma, K							R 05
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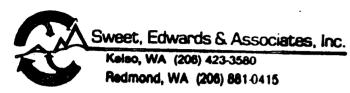
Sweet, Edwards & Associates, Inc. Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

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CLIENT INFO. Ken	John	son	<u> </u>		—	ALYSIS	_	_					~	, <u>-</u>	GENE (Spec	RAL CI ify)	IEMIS'	TRY			-	HER ecify)		
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SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	88 S	VOLATILE ORGANICS GC/MS/624/8240	38	E 5	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOT X	Circle 70	METALS (TOTAL) (See Special Inst.)	TCL _P	PH COND	NO3/NO2. CI SO4	Ca, Mg. Na, K	Sulfates	Sulfide	yanide			j	MOM.
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Sweet, Edwards & Associates, Inc.
Kelso, WA (206) 423-3580
Redmond, WA (206) 881-0415

Chain of Custody/ Laboratory Analysis Request DATE 1-12 85 MAGE 1 OF 2

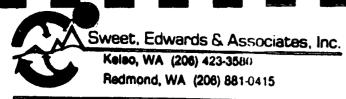
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SAMPLE I.D. DATE	TIME	LAB I.O.	TYPE	BASE/NEU/ACIO ORGAN. GC/MS/625/8270	200 300	E E	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL (TOX)	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND ALK	NO3/NO	Ca, Mg, Na,	MELLUAN	110			ŀ		N S
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SAMPLE I.D.	DATE	TIME	LAB 1.D.	TYPE	8 S	VOLATILE OPGANICS GC/MS/624/8240	돌용	PHENOLICS 804/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND ALK	NO3/1	Ca, Mg. Na.	Marcust	110					2 2
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SAMPLE I.D. DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	53	38	38/38	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTA (TOX	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	OH COND	NO3/NO2. CI SO4	3.	Mercu				1	ľ	5
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Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

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SAMPLERS NAME JAMES	Marke	<u>cs</u>	PHONE#	المحادث	,	/ACI	A/82	TED 801/		AR 610/	ANIC 9060	ANIC	¥.	TAL)	NICS			×	'				05 CO
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SAMPLE I.D.	DATE	TIME	LAB I.D.		TYPE	BASE 6C/N	VOLATILE ORGANICS 6C/MS/624/8240	HALO	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL (TOX)	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	の	NO3/NO2. CI SO4	Ca, Mg.	Hg				HUMBER
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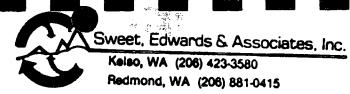
Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

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CLIENT INFO. CONTACT FOR JO.	M as 50 a				AN	ALYSI	REQU	ESTED	·	,		· · · · · · · · · · · · · · · · · · ·	_		GENE (Spec	RAL CI	HEMIS	TRY				HER ecity)		
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TELEPHONE#		·			BASE/NEU/ACID ORGAN GC/MS/625/8270	NICS 40	20 8 20 5		8310	CAR	HAL	ETALS												CONTAINERS
SAMPLERS NAME	MON	465	PHONES SE	K PO	1/AC	ORG.	TED (SOL)		EAR 610	ANIC 9060	ANIC	₹	JTAL)	NICS			~							0F C0
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SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE GC/V	VOLATILE ORGANICS GC/MS/624/8240	PRG PRG	SEN SEN	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	B ₹	NO3/NO2. CI SO4	Ca, Mg. Na,	5/1	, }					NUMBER
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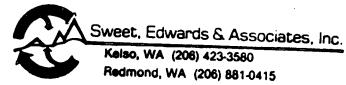
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Weet-Edwards / EMCON, Inc. 10, WA (208) 423-3580 mond, WA (208) 881-0415	Chain	of	Custo	dy/
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SAMPLERS SIGNATURE	Al	WI	PHONE#		BASE/NEU/ACID ORGAN. GC/MS/625/8270	TILE OR	GENATE NICS 60	OLICS 3040	VUCLEA	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS	GEE Special Inst.)	TCLP ORGANICS	(2)	5 %	J. Na. K							YUMBER OF CONTAINERS
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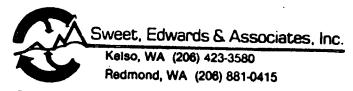
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Sweet, Edwards & Associates, Inc. Kelso, WA (208) 423-3580 Redmond, WA (208) 881-0415

Cain of Custody/ Laboratory Analysis Request

DATE SEPT 3

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SAMPLERS NAME S. P. SAMPLERS SIGNATURE	Hensha	»h	PHONES <u>423-</u> ,	3280	/NEU/ACI	TRE ORG/ 15/624/8	GENATED NICS 601,	PHENOLICS 804/8040	NOCLEAR ATIC 610,	TOTAL ORGANIC CARBON (TOC) 415/9060	OPGANIC 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND	ان در		100	Cyan.de	/10c/				NUMBER OF CONTAINERS
SAMPLE I.D.	DATE	TIME	LAB 1.D.	TYPE	BASE 6C/V	23	35	2 × 2	AROM	TOTAL (30C)	P S	Circle To	METAI (See S	TCLP	E E	NO3/N		M3,B.	7,4	F/c				W CW
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SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE 6C/W	\$ 50 X	HALO	PHEN 604/8	A BOLY	10TA	TOTAL	Circle 10	META!	10.1	F X	NO3/N	∂r 12	150		1	J.			MUM
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APPENDIX D

LABORATORY RESULTS

1152 3rd Avenue • Longview, WA 98632 • (206) 577-7222

September 8, 1987

Craig Wells Sweet & Edwards P.O. Box 328 Kelso, WA 98626

RE: Weyco Chlorine Flant--Ken Johnson

Dear Craig,

Enclosed are the results for tests done on samples submitted to our lab on July 21, 22, and 24 1987. For your reference our service request numbers for this work are 87387, 87396, and 87408.

If you have any questions please give us a call.

Respectfully submitted, COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

Mike Shelton

COLUMBIA ANALYTICAL SERVICES 1152 3RD AVE. LONGVIEW, WA (206) 577-7222

Chlorine Chlorine Plant and Interox

CLIENT: Sweet & Edwards

--Craig Wells

Date:

PROJECT: Weyco Chlorine Plant

--Ken Johnson

Work (

Analytical Report

Sample	Lab Code	Solids %	EP TOX Mercury mg/L in Extract	Total Mercury mg/kg Dry Basis
MW-1-1 MW-1-2 MW-1-3 MW-1-4 MW-1-5 MW-1-6 MW-1-7 MW-1-8	387-1 387-2 387-3 387-4 387-5 387-6 387-7 387-8	96 95 95 82 79 78 80 78	10.0002 <0.0002 <0.0002 <0.0002 0.0043 <0.0002 <0.0002 <0.0002	<0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1

QA-QC Report

Sample	Type	Units	A	В	AVG	Spike Level	Recovery %
MW-1-1	Total	mg/kg	<0.1	<0.1	<0.1	0.44	102
MW-1-4	EPTOX	mg/L	<0.0005	<0.0005	<0.0005	0.0010	102

Approved by: Mike Shelfon Date: 9/8/87

COLUMBIA ANALYTICAL SERVICES, INC. 1152 3RD AVE. LCNGVIEW, WA 98632 (206) 577-7222

CLIENT: Sweet & Edwards

Date: September 8, 1987

--Craig Wells

Work Order: 87396

PROJECT: Weyco Chlorine Plant -- Ken Johnson

Analytical Report

Sample	Lab Code	Solids %	EP TOX Mercury mg/L in Extract	Total Mercury mg/kg Dry Basis
M-2-1A	396-1	95	<0.0002	<0.1
M¥-2-2A	396-2	93	< 0.9002	<0.1
X¥-2-3A	39 6- 3	93	< 0.0002	<0.1
M-2-4A	396-4	69	0.00021	0.46
M4-2-5A	396-5	72	<0.0002	<0.1
MW-2-6A	396-6	75	<0.0002	<0.1
⊠-2-7 A	396-7	78	<0.0002	<0.1
M-2-8A	396-8	7 9	<0.0002	<0.1
M3-1A	396-9	92	<0.0 002	<0.1
MW-3-2A	396-10	83	0.00024	1.9
MW-3-3A	396-11	86	<0.0002	<0.1
MW-3-4A	396-12	95	<0.0002	<0.1
Y3-5A	3 96-13	82	<0.0002	<0.1
MW-3-6A	396-14	77	<0.0002	<0.1
MW-3-7A	396-15	78	<0.0002	<0.1
M#-3-8A	396-16	80	<0.0002	<0.1

QA-QC Report

Sample	Туре	Units	A	В	AVG	Spike Level	% Recovery
MW-2-1A MW-3-4A	Total Total	mg/kg mg/kg	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	0.43 0.34	86 124
MW-3-2A	EPTOX	mg/L	0.0002	0.0002	0.0002	0.001	118

Approved by: Mike Shelton Date: 9/8/87

7

COLUMBIA ANALYTICAL SERVICES, INC. 1152 3RD AVE, LONGVIEW, WA 98632 (206) 577-7222

CLIENT: Sweet & Edwards

--Craig Wells

Date: September 8, 1987

PROJECT: Weyco Chlorine Plant -- Ken Johnson

Work Order: 87408

Analytical Report

Sample	Lab Code	Solida Q	EP TOX Mercury mg/L in Extract	Total Mercury mg/kg Dry Basis
MW-4-1A MW-4-2A MW-4-3A MW-4-4A MW-4-5A MW-4-6A MW-4-7A MW-4-7A MW-4-9A MW-4-10A	403-1 408-2 408-3 408-4 408-5 408-6 408-7 408-9 408-9	94 90 95 94 94 80 79 75 73	<0.0002 <0.0002 <0.0002 <0.0002 <0.0002 <0.0002 0.0005 0.0005 <0.0002 <0.0002	<0.1 0.2 0.2 0.1 <0.1 <0.1 <0.1 <0.1 0.1

QA-QC Report

Sample	Type	Units	A	В	Avg	Spike Level	% Recovery
MW-4-4A	Total	mg/kg	0.2	<0.1	0.1	0.5	76
MW-4-5A	EPTOX:	mg/L	10.0002	<0.0002	<0.0322	0.001	119

Mike Shelton Date: 9/8/87 Approved by:

COLUMBIA ANALTYICAL SERVICES, INC. 1152 3RD AVE. LONGVIEW, WA 98632 (206) 577-7222

CLIENT: Sweet & Edwards

--Craig Wells

PROJECT: Weyco/Interem

Date: September 9, 1987

Work Order: 87393, 87399,

87402, 87404, 87409,

87432

Analytical Report

Sample Name	:	MW-1	MW-2	MW-3	MW-4
Lab Code:		432-1	432-2	432-3	432-4
pH	y umhos/cm	6.4	6.3	6.3	10,4
Conductivit		1170	88000	490000	25000
Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01
Sulfide	mg/L	<1	<1	<1	360
Sulfate	mg/L	153	500	1020	616
Mercury Barium Chromium Iron Lead Manganese Sodium	mg/L mg/L mg/L mg/L mg/L mg/L	<0.0002 0.09 <0.01 12 0.037 2.2 109	<0.0002 0.29 <0.1 46 <0.010 8.6 16000	0.004 <1.0 <1.001 <5 <0.010 <1	0.039 0.076 <0.05 2.2 0.050 <0.01 5120
TOX	mg/L	0.10	1.46*	24.8*	5.39*

^{*} Possible inorganic chloride interference. Sample dilutions and extra potassium nitrate washing was performed to removed as much inorganic chloride as possible.

Muncent

Approved By:

Date

9/9/87

1152 3rd Avenue • Longview, WA 98632 • (206) 577-7222

October 7, 1997

Craig Wells Sweet & Edwards F.G. Box 328 Kelso, WA 98632

RE: Soil

Dear Craig:

Enclosed are the results of samples submitted to our lab on September 4, 1987. For your reference, our service request number for this work is 87528.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

Mike Shelton

CLIENT:

Sweet & Edwards

--Craig Wells

PROJECT: Interox

October 7, 1987

WORK ORDER #: 87528

Analytical Report Total mg/kg Dry Basis

Sample Name:	2 #3 529-7	2 #4 528-8	0 #1 528-9	3 #2 528-10	3 #3 E2 9- 11	3 #4 528-12
Lead Chromium Barium Mercury Sodium Solios %	98 28 123 2.7 6040 77.0	52 20 110 1.3 3300 93.0	2:0 33 433 1.0 5870 78.9	184 46 210 1.0 3420 76.0	149 38 139 1.2 11100 57.6	<30 84 12 <0.7 17700 28.4
			EP TOXICIT mg/L	Y		
Lead Chromium Barium Mercury	<0.5 <0.1 0.39 0.000	- - - -	<0.5 <0.1 0.45 0.0012	<0.5 <0.1 0.64 0.025	- - -	- - -
*Cadmium *Silver	<0.05 <0.1	-	<0.05 <0.1	<0.05 <0.1	- -	-

^{*} Added at no charge.

Approved by:	Mike	Stellon	Date:_	10	17	18	7
			-				_

Dulen": Sweet & Edwards

--Craig Wells

PROJECT: interpr

October 7, 1987

WCR: CRDER =: 97528

Phalytudal Report Total mg/kg

Sample Name: Lac Code:		1 #2 528-1	1 #3 908-3	1 #4; E28-4	2 #. 529-1	2 #2 528-4
Lead Dhromium Barium Mercury Bodium Bolics %	.45 14 103 1.3 2750 90.3	247 20 93 0.4 7780 75.3	99 18 141 0.3 7133 77.5	40 9.5 211 <0.2 1700 90.9	14 14 82 <0.3 7410 87.8	108 18 152 <0.3 10700 58.2
			EP TOXICIT	ſγ		
Lead Chromium Parium Mercury	<0.5 00.1 0.00 0.0004	<0.5 <0.1 <0.2 0.0007	- - - -	- - -	<0.5 <0.1 0.42 0.0028	- - -
*Cadmium *Silver	<0.0 5 <0.1	<0.05 <0.1	<u> </u>	-	<0.05 <0.1	-

^{*} Added at no charge.

Approved by: Miles Sletton	Date:	10/7/87
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1152 3rd Avenue . Longview, WA 98632 . (208) 577-7222

October 7, 1987

Craig Wells Sweet Edwards P.O. Box 328 Kelso, WA 98625

RE: Water & Soil

Dear Chaigs

Enclosed are the results of samples submitted to our lab on September 4, 1987. For your reference, our service request number for this work is 87506.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES. INC.

Mike Shelton

Mike Shelton

CLIENT:

Sweet Edwards

第2

--Craig Wells

PROJECT: Interox

October 7, 1987

WORK ORDER #: 87526

Analytical Report mg/L

Sample Name: Lab Code:	A A 526-1	-2 B 526-2	7 C 524-3	- } D 526-4
рН	* 10.5	6.7	7.1	7.1
Conductivity micromhos/cm	21740	20120	12.0	91000
Fluoride	1.9	<pre><0.05 <0.01</pre>	0.40	0.57
Cyanide	<0.025		<0.01	<0.01
Parium	0.33		0.08	1.1
Chromium	<0.02		<0.02	<0.2
Lead	<0.01		<0.005	<0.1
Sodium	4040		80	949000
Mercury	0.033		<0.005	<0.005

High presence sulfide

as per Mike 1-26-88

Approved by: Mike Shelton Date: 10/7/87

CLIENT:

Sweet Edwards

--Craig Wells

PROJECT: Interox

October 7, 1987

WORK ORDER #: 87526

Analytical Report mg/L

Sample Name:	T	X	Y	Z
Lab Code:	526-5	526-6	526-7	526-a
pH	5.7	6.5	6.4	6.5
Conductivity micromnos/cm	3.3	206	157	177
Fluoride Syanide Parium Chromium Lead Sodium Mercury	<0.05 <0.01 <0.01 <0.02 <0.005 0.7 <0.005	0.23 <0.01 0.03 <0.02 <0.005 15 <0.005	0.21 <0.01 0.05 <0.02 <0.005 20 <0.005	0.18 <0.01

all are <0.0005

as per mike 1-26-88

Approved by: __ Mike Shellon Date: 10/7/87

CLIENT:

Sweet Edwards

--Craig wells

FRGJECT: Interox

October 7, 1997

WORK ORDER #: 87526

Analytical Report mg/kg

Earole Vane: Leo Cope :	X 316-9	Y 524-10	Z Elámia
Sarium Domonium Lead Sodium Yercury	4.5 <14 695 <0.2	27 5.0 <14 465 <0.2	27 5.0 <10 434 <0.2
Solids %	73.0	74.5	75.5

EP Toxicity mg/L

Earium Chramium Lead Mercury	- - -	- - -	<0.02 <0.01 <0.05 <0.0005
Silver Cadmium	-	-	<0.01 <0.01

Approved by: Mike Shelk Date: 10/7/87

7

November 9, 1987

Jim Morales Sweet & Edwards P.O. Box Drawer B Kelso, WA 98626

RE: Weyerhaeuser Chlorine Project

Dear Jim:

Enclosed are the results of samples submitted to our lab on November 4, 1987. For your reference, our service request number for this work is 87717.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

Mike Shelton

CLIENT:

Sweet & Edwards

--Jim Morales

PROJECT: Weyerhaeuser Chlorine Project

November 9, 1987

WORK ORDER #: 87717

Analytical Report

			Mercury	/		
Sample	e Name	Lab Code	mq/L	Duplicate	Spike Level	% Recovery
						·
M-1 A	$m \omega = 1$	717-1	<0.0002	<0.0002	0.001	101%
M-1 B	1.	717-2	<0.0002			• • • • •
M-1 C	**	717-3	<0.0002			
M-1 D		717-4	<0.0002			
M-2 A	~ w-4	717-5	0.027			
M-2 B	11	717-6	0.031			
M-2 C	1.	717-7	0.025			
M-2 D	1.0	717-B	0.030			
M-3 A	mw-2 .	717-9	<0.0002			
M-3 B	**	717-10	<0.0002			
M-3 C	19	717-11	<0.0002			
M-3 D	• •	717-12	0.0002			
M-4 A	mw-3	717-13	<0.0002			
M-4 B	*1	717-14	<0.0002			
M-4 C		717-15	<0.0002			
M-4 D	. •	717-16	<0.000 2			
111-5	Transfer	717-17	0.0004			

Approved I	by:	Mile	S	helten	Date:_	11	19	/87	
			_			,		,	_

1152 3rd Avenue . Longview, WA 98632 . (206) 577-7222

January 18, 1988

Jim Morales Sweet & Edwards P.O. Box Drawer B Kelso, WA 98626

RE: Chlorine Plant

Dear Jims

Listed below are the results of samples submitted to our lab on January 12, 1988. For your reference, our service request number for this work is 88026.

Please call if you have any questions.

Analytical Report

Sample Name:	Lab Code	рН	Conductivity umhos/cm	Mercury mg/L
MW-1/W1+W2	026-1	7.1	740	0.0005
MW-2/W1+W2	026-2	10.2	3 638	0.0120
MW-3/W1+W2	026-3	5.5	5	0.0009
MW-4/W1+W2	026-4	6.4	63000	0.002
MW-5/W1+W2	026-5	6.2	283800	0.003

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

1152 3rd Avenue • Longview, WA 98632 • (206) 577-7222

April 7, 1988

Craig Wells Sweet & Edwards P.O. Drawer B Kelso, WA 98626

RE: Chlorine Plant; CAS Work Order # 88196

Dear Craig:

Listed below are the results of samples submitted to our lab on March 7, 1988. For your reference, our service request number for this work is 88196.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

CLIENT:

Sweet & Edwards/Emcon

April 7, 1988

PROJECT: W

--Craig Wells Weyerhaeuser Chlorine Plant

WORK ORDER #: 88196

Analytical Report

Sample Name	Lab Code	рН	Conductivity umhos/cm	Mercury mg/L
W-1	196-1	6.3	49000	<0.0008
₩ -2 ////////	196-2	6.7	890	<0.0008
W-3	196-3	10.7	7320	0.012
W-4 Care	196-4	7.5	4.9	<0.0008
W-5 + 43	196-5	5.2	474000	<0.0008

Approved by: Mike Sletten Date: 4/7/88

1152 3rd Avenue . Longview, WA 98632 . (206) 577-7222

May 20, 1988

Jim Morales Sweet - Edwards/Emcon P.O. Drawer B Kelso, WA 98626

RE: Weyerhaeuser Chlorine Plant

Dear Jim:

Enclosed are the results of samples submitted to our lab on May 10, 1988. For your reference, our service request number for this work is 88406.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Carol Duplaga

Carol Duplaga

CLIENT:

Sweet - Edwards/Emcon

May 20, 1988

--Jim Morales

PROJECT: Weyerhaeuser Chlorine Plant

WORK ORDER #: 88406

Analytical Report

Sample Name	Lab Code	ρН	Conductivity umhos/cm	Mercury mg/L
WC-588-W-1 ***********************************	406-1	7.0	720	<0.0002
WC-588-W-2	406-2	6.5	38440	<0.000B
WC-588-W-3 net	406-3	9.3	3200	0.0026
WC-588-W-4 1746K	406-4	7.9	852	<0.0002
WC-588-W-5	406-5	6.9	448000	<0.0008
WC-588-W-6	406-6	8.4	228	<0.0002
WC-588-W-7 34	406-7	8.0	202	<0.0002
WC-588-W-8 (1.40 pt.	4 406-8	7.7	3	<0.0002
WC-588-W-9 5.4	406-9	6.9	204	<0.0002
WC-588-W-10	406-10	6.9	750	<0.0002
WC-588-W-11 346-2	406-11	6.4	37060	<0.0008
WC-588-W-12	406-12	9.3	3200	0.0026
WC-588-W-13 Mag	406-13	7.8	830	<0.0002
WC-588-W-14	406-14	6.8	492000	<0.000B
WC-588-W-15	406-15	8.0	224	<0.0002
WC-588-W-16	406-16	7.8	204	<0.0002
WC-588-W-17 Correc	^-406 -17	7.6	. 2	<0.0002
WC-588-W-18 1	406-18	6.9	208	<0.0002

Approved by: Chuplage

Date: 5/19/88



Weyerhaeuser Paper Company

Longview. Washington 98632 (206) 425-2150

May 25, 1988

Craig Wells Sweet Edwards/Emcon, Inc. P.O. Drawer 8 Kelso, WA 98626

Dear Craig:

Attached is a copy of the WTC analysis of ground and surface waters collected on May 9 in the vicinity of our Chlor-Alkali plant.

Sincerely,

Ken Johnson

	NALYTICAL LAI						EQUEST	r	REQU	JEST NO. UNIT CODE
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NAME C	TEST OR METHOD		%	Range PPM	•			SENSITIVITY	<i>i</i>	
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SAMPLE DESCR	*Indicate volume or w		15 ON (J.D. 0	as rec	erved sa	mple, etc.		10 1	Manager of section work is assig
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ANALYTICAL LAB CODE	SAMPLE DESIGNATION	0	ROPE	RTIES	TO BI	E	ANALYTI		RPLE NATION	PROPERTIES TO BE
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0965 <u>5</u> 09656	W-6 W-7 W-8 W-9		You	___\			- Ques	Christian	Ext. 6	itional sheets if necessary

WEYERHAEUSER ANALYTICAL LABORATORIES ATOMIC SPECTROSCOPY

SR17442 . LONGVIEW CHLOR-ALKALI PLANT WATER TOTAL HG

SAMPLE I.D.	LAB CODE	HG (Vm/L)
VC-5-88-V-1 VC-5-88-V-2 VC-5-88-V-3 VC-5-88-V-4 VC-5-88-V-5 VC-5-88-V-6 VC-5-88-V-7 VC-5-88-V-8 VC-5-88-V-9	09649 09650 09651 09652 09653 09654 09655	(ug/L) <.2 <.3 2.0 <.2 <.5 <.2 <.2 <.2 <.2 <.2
	09657	.2

NOTE: Detection limits vary from sample to sample due to the varying salt content.

DUPLICATE AND SPIKE RESULTS:

SAMPLE I.D.	LAB CODE	SAMPLE	DUP.	SPIKE	NET	SPIKE	¥
VC-5-88-V-1		(Hg, ug	/L		SPIKE	LEVEL	REC.
VC-5-88-V-2 VC-5-88-V-5	00650	<.2 <.3 <.5	<.3 <.5	2.0 8.5 8.5	2.0 8.5 8.5	2.0 10. 10.	100 85

Teff Chitian 5-19-88

Line of Alle

111 ,

1152 3rd Avenue . Longview, WA 98632 . (206) 577-7222

July 28, 1988

Craig Wells Sweet - Edwards/Emcon P.O. Drawer B Kelso, WA 98626

RE: Weyco Chlorine Plant Project

Dear Craig:

Enclosed are the results of samples submitted to our lab on July 7, 1988. For your reference, our service request number for this work is 88581.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Mike Shelton

CLIENT:

Sweet - Edwards/Emcon

July 28, 1988

PROJECT:

--Craig Wells Weyco Chlorine Plant

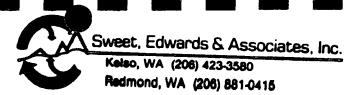
WORK ORDER #:

88581

Analytical Report

Sample Name	Lab Code	рН	Conductivity umhos/cm	Mercury mg/L
WC-788-W1 WC-788-W2 WC-788-W3 WC-788-W4 WC-788-W5 WC-788-W6 WC-788-W7 WC-788-W8	581-1 581-2 581-3 581-4 581-5 581-6 581-7 581-8 581-9	9.3 7.0 6.7 6.6 6.8	3,984 - 874 398,000 - 34,900	0.004 0.006 0.001 0.001 0.0002 0.001 0.0001 0.0002 0.0002

Approved by_ Date



Chain of Custody/ Laboratory Analysis Request

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TELEPHONE#					- 18°	S	38		310	ARB	ALID	IALS												TAIN
SAMPLERS NAME	A.		_ PHONE#		AC:0	BASE/NEU/ACID ORGAN. GC/MS/625/8270 VOLATILE ORGANICS GC/MS/624/8240 HALOGENATED VOLATILE ORGANICS 601/8010 PHENOLICS 604/8040 POLYNUCLEAR AROMATIC 610/8310 TOTAL ORGANIC CARBON (TOC) 415/9060			NIC	FP TOX/TCLP METALS (Circle One) METALS (TOTAL) (See Special Inst.) TCLP ORGANICS PH. COND ALK N03/N02. CI S04 Ca. Mg. Na. K										NOS.				
CAMP FRO GIALLES					NEU/	ILE 0	ENA!	ECS FOS	UCLE TIC 6	ORGA 15/9	ORGA 9020	5 E	(E)	GAN	و	3	Z ,						İ	MBER OF CONTAINERS
SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/ GC/M	VOLAT GC/MS	HALOG	PHEN0 604/80	POLYNUCLEAR AROMATIC 610/8310	TOTAL (TOC) 4	TOTAL (TOX)	EP TOX	METALS See Sp	TCLP ORGANICS	PH. COND	103/NO	Ca. Mg. Na,							E ST
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Columbia Analytical Services, Inc.

1152 3rd Avenue • Longview, WA 98632 • (206) 577-7222

August 12, 1988

Craig Wells Sweet - Edwards/Emcon P.O. Drawer B Kelso, WA 98626

RE: "RUSH" Analyses of Weyco Chlorine Plant Project

Dear Craig:

Enclosed are the results of samples submitted to our lab on August 5, 1988. For your reference, our service request number for this work is 88684.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Couol Durlaga Carol Duplaga

CLIENT:

Sweet - Edwards/Emcon

August 12, 1988

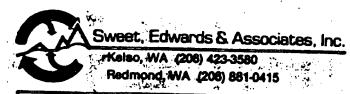
PROJECT:

--Craig Wells
"RUSH" Weyco Chlorine Plant

WORK ORDER #: 88684

Analytical Report

Sample Name	Lab Code	pH .	Conductivity umhos/cm	Mercury mg/L
WC-888-W1 WC-888-W2 WC-888-W3 WC-888-W4 WC-888-W6 WC-888-W7	684-1 684-2 684-3 684-4 684-5 684-6	6.2 10.4 7.5 6.2	8740 mm-2 368 mu-4 876 g ? mm-1 2960 ? mm-2 - mu-1 318 Trensfer	<pre><0.001 <.000 c 0.018 <0.001 <.0002 <0.001 <.0009 <0.001 <.0002 <0.001 <.0002 <0.001 <.0002</pre>
WC-888-W9 WC-888-W10	684-8 684-9	-	- -	<0.001 2.0009 <0.001 2.0002



Chain of Custody / Laboratory Analysis Request

PROJECT Wey . Co . Chlor	ine		T		-9°	*****	* * * *	7	AM . 25		6 450	To be	्रास	VIE &					OF TH			-1 33
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October 7, 1988

Craig Wells Sweet - Edwards/Emcon P.O. Drawer B Kelso, WA 98626

RE: Re-issue of CAS Work Order # 88684

Dear Craig:

Enclosed is a revised report of our Service Request No. 88684. The mercury results reflect individual detection limits. Also, the pH and conductivity results have been corrected. We are sorry if this has inconvenienced you in any way.

Please call if you have any questions.

Respectfully submitted: COLUMBIA ANALYTICAL SERVICES, INC.

Carol Duplaga Carol Duplaga

CLIENT:

Sweet - Edwards/Emcon

October 7, 1988

--Craig Wells

PROJECT:

"Re-Issue"; Weyco Chlorine Plant WORK ORDER #: 88684

Analytical Report

Sample Name	Lab Code	рН	Conductivity umhos/cm	Mercury mg/L
WC-888-W1	684-1	7.6	39,000	<0.0002
WC-888-W2	684-2	10.4	11,500	0.018
WC-888-W3	684-3	8.7	876	<0.0002
WC-888-W4	684-4	7.7	576,000	<0.0009
WC-888-W6	684-5	-	_	<0.0002
WC-888-W7	684-6	-	-	0.021
WC-888-W8	684-7	6.9	54	<0.0002
WC-888-W9	684-8	-	-	<0.0009
WC-888-W10	684-9	-	-	<0.0002

Approved by C Auglaga __Date____/0/1/88



Weyerhaeuser Company

March 28, 1988

Michael J. Spencer Hazardous Waste Clean-up Program Department of Ecology MS PV-11 Olympia, WA 98504

Dear Mr. Spencer:

DPR

Re: Chlor-Alkali Mercury Investigation

The joint Washington Department of Ecology and EPA site investigation report concerning the residual mercury contamination issue at Weyerhaeuser's Longview Chlor-Alkali plant was issued in February 1987. This report included requests for additional information and site characterization before the WDOE would recommend the site for removal from the CERCLIS list of active hazardous waste sites, and place it on the EPA list of sites requiring no further action.

In the late spring, 1987, a work plan was developed which addressed those additional agency information needs. Your review and comment on this work plan (Re. your May 27, 1987 letter) provided additional guidance for its implementation.

During the past 9 months, a number of the work tasks have been completed. The data from these are included in the attachment listed below.

1. "Weyerhaeuser Paper Company Chlorine Plant - Longview Mill Site - Soil and Groundwater Investigation Status Report", Sweet-Edwards/Encom, Inc., February 10, 1988. This report describes the installation of 4 shallow groundwater monitoring wells on the "West Site". Groundwater sampling and analytical data from 4 periods are reported. During well installation soil samples were collected at 2 1/2 foot depth intervals to the maximum boring depth. Analysis on these soil samples for total and EP-toxicity mercury concentrations has occured and these data are presented. All anlalytical work was completed by Columbia Analytical Services, Inc. in Kelso, Washington.

- Surface Water and Sediment Sampling Along Columbia River - Following the receipt of test data on the August 5, 1987 groundwater samples which showed the presence of mercury above MCL's in wells MW-3 and MW-4, an effort was made to assess possible mercury loss to the Columbia River. On September 3, 1987, three shallow hand auger holes were excavated along the Columbia River shoreline a few feet from the waters edge. sampling points are located between the boat launching ramp and the Reynolds Metal Company property boundary. The holes were excavated to a depth of 5 feet, and one soil sediment sample was collected from each hole and analyzed for total mercury concentration. One of the three samples was analyzed using EP-toxicity test methods. A peristaltic pump was used to obtain one water sample from each borehole. These samples were also analyzed for total mercury concentration. sampling was completed by Sweet-Edwards/Encom personnel and analytical work by Columbia Analytical Services. site plan showing the sample locations and a data table displaying analytical results are included as attachment
- 3. East Site Expanded Soils Assessment In an effort to further characterize the extent of any residual mercury contamination of the East Site area additional soil samples were collected. Those included:
 - a. Depth integrated samples of 7 locations which coincide with the sites of the former brine sludge ponds. These ponds were cleaned and backfilled with clean sand in the mid-1970's. Through backhoe excavation, soil samples were collected from each visually different strata, or at least 3 depths (2, 5, and 10 feet.)
 - b. Bottom sediment samples a 2 locations along the stormwater drainage ditch adjacent to the northeast corner of the old chlorine plant cell room building.

These 9 samples were collected by Weyerhaeuser personnel and split for possible duplicate analysis by the WDOE. The Weyerhaeuser samples were analyzed at the Weyerhaeuser Technology Center Analytical Laboratory in Federal Way, Wasington. Both total and EP-toxicity mercury concentration tests were performed. A site drawing showing sample locations and a data table displaying test results are enclosed as attachment 3

Remaining work to be accomplished under the work plans is simply the continuation of bimonthly groundwater monitoring through July 1988. During the May, 1988 monitoring, surface water and sediment sampling along the Columbia River will be repeated.

Feel free to contact me with any questions you might have on this information.

Sincerely,

Ken Johnson

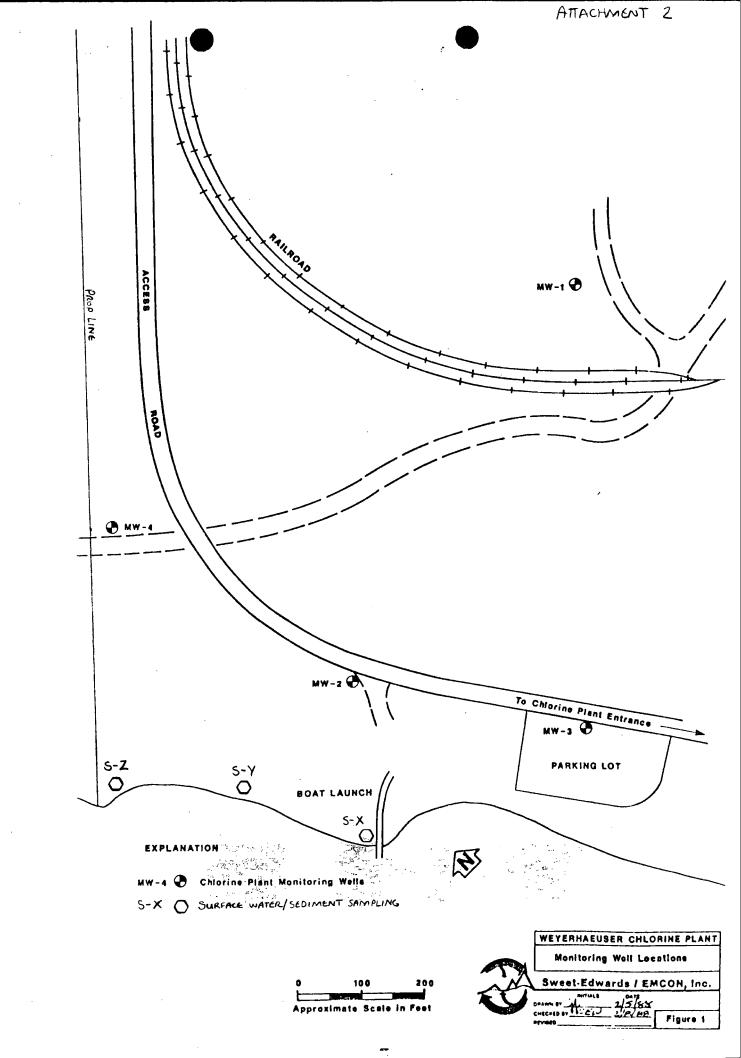
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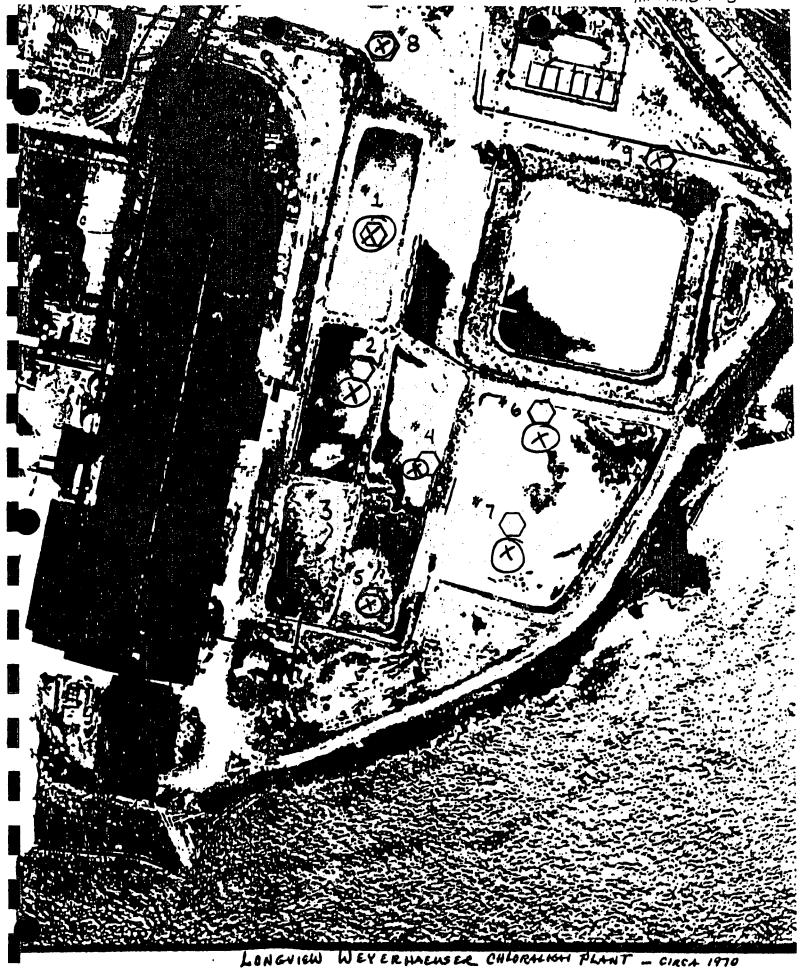
Attachment 2

WEYERHAEUSER - LONGVIEW CHLOR ALKALI PLANT SURFACE AND SEDIMENT SAMPLING ALONG COLUMBIA RIVER

September 3, 1987

LOCATION	SOIL QUALITY TOTAL(mg/kg)	DATA EPTOX (mg/l)	WATER QUALITY DATA TOTAL (mg/l)
s - x	< 0.2		< 0.005
S - Y	< 0.2		< 0.005
s - z	< 0.2	<0.0005	< 0.005





LONGVIEW WEYERHAEUSER CHERALISH PLANT - CIRCA 1976
PRIOR TO BRINE POND REMOVAL.

PROPOSED SOIL AND DITCH SAMPLING LOCATIONS
- SUNE 16,1987

ANALYTICAL BORATORY SERVICES REQUEST Research and Development - Scientific Services ORALKALLI EST. START DATE SECTION Environmental Mgr. x6452 Spectrometry & Gen. Mgr. x6148 Grayed area for analytical use only. Expected Report SPECIAL HANDLING REPORT BASIS LOWER LIMIT NAME OF TEST OR METHOD Range PPM SENSITIVITY **%** PPB 🕷 Keep Chilled 🗆 🗆 Keep Frozen M ☐ Other PRESERVATIVE ADDED □ No Kind ☐ Yes Amount Submit request & samples to: SAMPLE RECEIVING Ship - WTC Lab 233S Mail - Sort WTC 2E25 Phone ext. 6293 Refer questions to above extension or *Indicate volume or weight basis on O.D. or as received sample, etc. to Manager of section work is assigned. SAMPLE DESCRIPTION AND HISTORY SOIL SAMPLES (Include potential hazards) FROM AREA BRINE PONDS LV. ANALYTICAL SAMPLE PROPERTIES TO BE ANALYTICAL SAMPLE PROPERTIES TO BE LAB CODE DESIGNATION **EVALUATED** DESIGNATION LAB CODE EVALUATED 95923 95938 6-2 *6-5* INTERIM REPORT DESIRED NOTE: Use additional sheets if necessary REFERENCES RECORD BOX SIGNATURE . PAGE NUMBER attached pages

Weyerhaeuser Longview Chlor-Alkali Plant East Side Sampling Study June 16, 1987

SOIL SAMPLE LOCATIONS

Š	i	t	e	No.	(See	
~	-	~	$\overline{}$	-10	•		

Site No. (See			
Map)	Sample ID	Sample Depth (ft)	<u>Strata</u>
1	1-2	2 5	Sand fill
	1-5	5	Brown Pea Gravel
	1-10	10	Black Fine Soil/ Sand
2	2-2	2	Sand Fill
	2-5	2 5	Brown Pea Gravel
	2-10	10	Black Fine Soil/ Sand
3	3-2	2	Sand Fill
	3-5	2 5	Brown Pea Gravel
	3-10	10	Black Fine Soil/ Sand
4	4-2	2	Brown Sand/small gravel
	4-5	5	Sand fill
	4-20	10	Blk organic sand wood chips
5	5-2	2	Gray sand
	5-5	5	Gray fine sand
	5-10	10	Dark gray find sand, banding
6	6-2	2	Gray sand
	6-5	5	Gray clay, fine sand
	6-10	10	Gray clay fnsnd
7	7-2	2	Gray sand
	7-5	2 5	Gray clay, fine sand
	7-10	10	Gray clay, fine sand

DITCH SAMPLES

8	8	UPPER	DITCH	NEAR	OLD	CELL	ROOM
•	•	OL L DIV	DIICH	MULL	OHD		KOOM

⁹ 9 LOWER DITCH

WEYERHAEUSER TECHNOLOGY CENTER

Analytical Laboratories Tacoma, Washington

es D

0.02 mg/8.

REPORT

Service Request 15719

Page ____ of ____

LONGVIEW CHLORALKALI

	SOIL SAMPLES	
Lab code sample	Hg EP. TOX.	HOTAL
	ngl	4.01 plan
95923 A 1-2	20.2	5.5 7.7 4.9
	20.0	7.7
924 1-5	0.28	4.9
925 1-10	<0.2	34.
926 3-7	ZO.2	0.084
927 2-5	0.88	1.5
928 2-10	0.46	0.33
929 3-2	0.36	38
930 3-5	∠⊙	1.10
931 3-10	27.0	19
932 4-2-	0.36	23
933A 4-5	8.2	80
181	8.0	8.3
934 4-10	20.2	2.3
935 5:2	40.2	1.7
936 5.5	ح.ک	040
937 540	40.2	0.31
938 6-2	40.2	0.097
939 6-5	0.28	1.7
1 940 6-10	0.46	0.39
941 72	A.2	36
942 7.5	40.2	10.
	40.2	0.66
943 7-10 944 8 DITCH	0.28	
V. 945 9 DITCH	۷٥٠٦	15. 35.
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WEYERHAEUSER TECHNOLOGY CENTER

Analytical Laboratories Tacoma, Washington



REPORT

Service Request	157	19
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Page _____ of ____

LONGVIEW CHLORALKALI

2011 SAMPLES						
Labcode		OVELECE	SPIKE	Net Spike	Spike Level	LECONEL A
		ugll -				
95923	Hg EP.TOX.	20.2	ಎಂ	٥.٥	2.0	100
95933		8.1	10.7	a .1	2.0	105
95923	Ha	1919,0.D.	12.	5.4	>	1-0
	HOTAL				5.4	100
95933	- L	8.2	12.	38	6.2	(ه)
76		77				

Approved	Wyg	_ Date	Notebook	
		P	Page Number	

WEYERHAEUSER PAPER COMPANY CHLORINE PLANT - LONGVIEW MILL SITE SOIL AND GROUND WATER INVESTIGATION STATUS REPORT

February 10, 1988

SUBMITTED TO:

Weyerhaeuser Paper Company Longview Mill Site Longview, WA 98632

SUBMITTED BY:

Sweet-Edwards/EMCON, Inc. P.O. Drawer B Kelso, WA 98626

S4101.02

WEYCO-R.210LK

WEYERHAEUSER PAPER COMPANY CHLORINE PLANT - LONGVIEW MILL SITE TABLE OF CONTENTS

	Page No.
1.0	BACKGROUND AND PURPOSE
2.0	FIELD WORK
	2.3 QUALITY ASSURANCE/QUALITY CONTROL
3.0	LABORATORY TESTING RESULTS
	TABLES
	After Pg. No.
1	CALL and Chained Makes Commission Commission
2	Tahawatawa Cail Amalamin Daka
3	Laboratory Soli Analysis Data
3	Laboratory Water Quality Data
	FIGURES
	After Pg. No.
1	MODITORISM MAIL TAGALIAM Wass
2	
3	Typical Monitoring Well Installation
3	Typical Security Casing Installation
	APPENDICES
	(following text)
A	Monitoring Well Logs
В	Field Data Forms
С	Chain of Custody Forms

WEYERHAEUSER PAPER COMPANY CHLORINE PLANT - LONGVIEW MILL SITE SOIL AND GROUND WATER INVESTIGATION

1.0 BACKGROUND AND PURPOSE

Previous investigations by Weyerhaeuser have shown that there are low concentrations of mercury in the shallow soils near the salt storage piles west of the chlorine plant. The purposes of this investigation are to: 1) further define the extent of mercury soil contamination, and 2) determine the extent of mercury ground water contamination, if present.

2.0 FIELD WORK

Field work at the site began in July 1987. Work completed to date included the installation of four monitoring wells, ground water sampling, and laboratory testing. Sampling of the wells will be completed every other month for one year.

2.1 MONITORING WELL INSTALLATION

Four monitoring wells were installed at the locations shown on Figure 1. Monitoring wells MW-1, MW-2, and MW-3 were first installed to obtain ground water elevation data. The shallow ground water flow direction was calculated from this data and used to select a downgradient location for well MW-4.

Wells were installed using a CME 75 drill rig with 6-inch I.D. hollow stem auger. Soil samples were taken every 2 1/2 feet to the maximum boring depth of 20 1/2 to 26 1/2 feet below ground surface (see well logs, Appendix A). The samples were later submitted for laboratory testing, as listed on Table 1.

Upon completion of the boring, monitoring wells were constructed with 2-inch diameter schedule 80 PVC screen and casing (Figure 2). The screened section consists of 15 feet of factory milled PVC with 0.010-inch slots. All joints are flush threaded to avoid water quality effects from the use of solvent cements. An annular filter pack of Aqua 8 Monterey sand was installed from the bottom of the borehole to approximately 1 to 2 feet above the top of the screen. The remaining annular space around each well was filled with bentonite chips which provide an annular seal. A locked steel security casing set in a shallow concrete pad was installed over each monitoring well (see Figure 3).

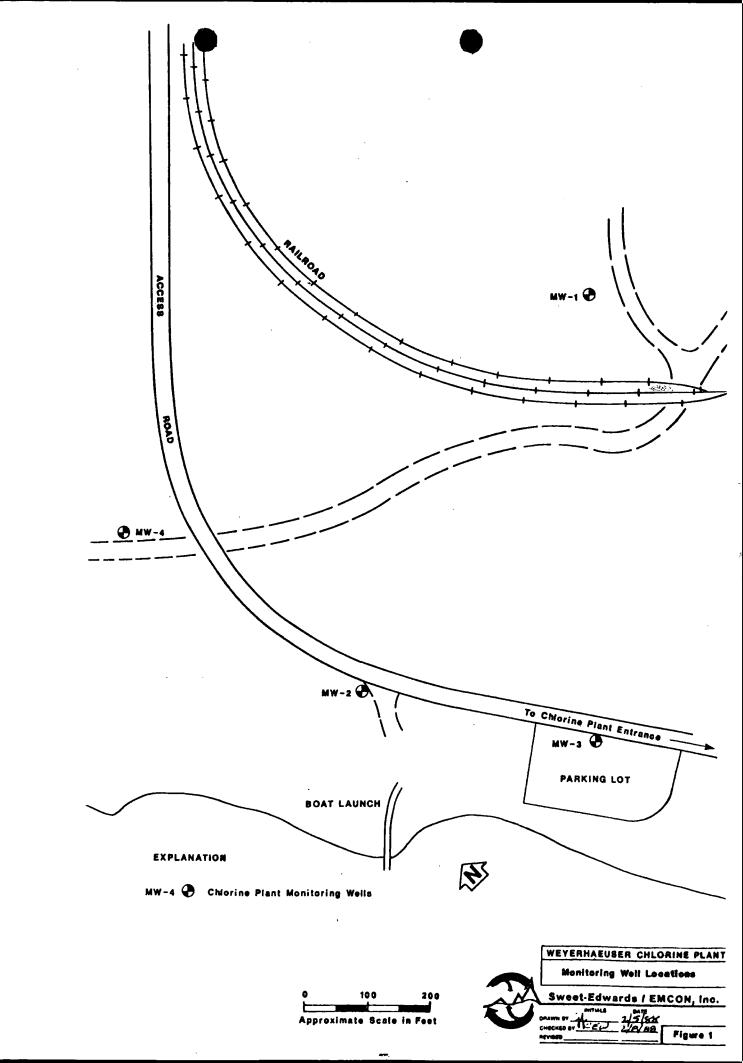


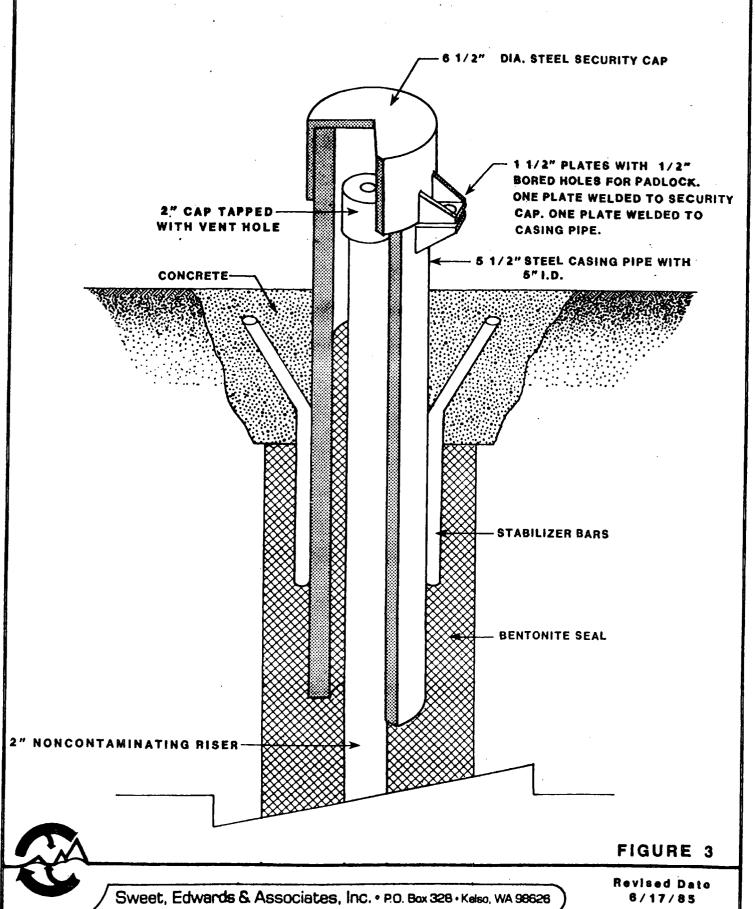
TABLE 1
SOIL AND GROUND WATER
SAMPLE SUMMARY

LOCATION	SAMPLE	SAMPLE
DESIGNATION	DATE(S)	DEPTH (ft.)
	WATER	
MW-1	8-5-87	10-19.5
	9-3-87	10-19.5
	11-4-87	10-19.5
	1-12-88	10-19.5
		20 23.3
MW-2	8-5-87	10-20
	9-3-87	10-20
	11-4-87	10-20
	1-12-88	10-20
MW-3	8-5-87	10-20
	9-3-87	10-20
	11-4-87	10-20
	1-12-88	10-20
MW-4	8-5-87	14-24
	9-3-87	14-24
•	11-4-87	14-24
	1-12-88	14-24
	SOIL	
Mr. 1		
MW-1	7-20-87	2.5-4
	7-20-87	5-6.5
	7-20-87	7.5-9
	7-20-87	10-11.5
	7-20-87	12.5-14
	7-20-87	15-16.5
	7-20-87	17.5-19
	7-20-87	20-21.5
MW-2	7-21-87	2.5-4
	7-21-87	5-6.5
	7-21-87	7.5-9
	7-21-87	10-11.5
	7-21-87	12.5-14
	7-21-87	15-16.5
	7-21-87	17.5-19
	7-21-87	20-21.5

LOCATION	SAMPLE	SAMPLE
DESIGNATION	DATE(S)	DEPTH (ft.)
	SOIL, continued	
MW-3	721 07	
M-3	7-21-87	2.5-4
	7-21-87	5-6.5
	7-21-87	7.5-9
	7-21-87	10-11.5
	7-21-87	12.5-14
	7-21-87	15-16.5
	7-21-87	17.5-19
	7-21-87	20-21.5
	, 21 0,	20-21.5
MW-4	7-23-87	2.5-4
	7-23-87	5-6.5
	7-23-87	7.5-9
	7-23-87	
		10-11.5
	7-23-87	12.5-14
	7-23-87	15-16.5
	7-23-87	17.5-19
	7-23-87	20-21.5
	7-23-87	22.5-24
	7-23-87	25-26.5
	. 20 07	43-40.3

SINGLE COMPETION MONITORING WELL -CAP (with security casing, CONCRETEabove ground or flush mounte BENTONITE SEAL NONCONTAMINATING CASING - THREADED JOINT SCREENED INTERVAL GRAVEL OR SAND PACK CONICAL DRIVE POINT WHERE NEEDED - BORE HOLE FIGURE 2 Sweet, Edwards & Associates, Inc. • P.O. Box 328 • Kelso, WA 98626 Revised Date: 2/23/87

MONITORING WELL SECURITY CASING



Following installation, the monitoring well screens were developed by bailing and pumping to remove fine sediments and maximize hydraulic connection between the annular sand pack and the formation. Screen development continued until discharge water was essentially sediment free.

2.2 GROUND WATER SAMPLING

The monitoring wells have been sampled four times since the wells were completed (see Table 1). Wells are purged and sampled using a peristaltic pump connected to polyethylene tubing dedicated to each well. Samples are collected in bottles provided by the contract laboratory (Columbia Analytical Services). Prior to sampling, each well is purged until a minimum of three pore volumes have been removed and field pH and/or conductance stabilized (+10%).

The field water quality data and sampling procedures are recorded on the Field Sampling Data Forms (see Appendices B-1 through B-4). Upon completion of sampling, all samples are delivered to the contract laboratory where custody is transferred (see Chain of Custody Forms, Appendix C).

2.3 QUALITY ASSURANCE/QUALITY CONTROL

All field work was completed following requirements of Sweet-Edwards/EMCON QA/QC procedures. All drilling and soil sampling equipment was decontaminated before use at each drilling/sampling location. Drilling equipment was cleaned using a high pressure/hot water washer. Water sampling equipment was cleaned using a non-phosphatic detergent wash followed by a solvent (MeOH) rinse and a deionized water rinse.

3.0 LABORATORY TESTING RESULTS

Testing results for soil samples are presented in Table 2. Mercury concentrations in water are presented in Table 3.

Mercury concentrations in the soils were above the detection limit (0.1 mg/kg) in 6 of the 34 samples collected. These samples were:

WELL	SAMPLE DEPTH	CONCENTRATION (mg/kg)
MW-2 MW-3 MW-4 MW-4 MW-4 MW-4	10-11.5 ft. 5-6.5 ft. 5-6.5 ft. 7.5-9 ft. 10-11.5 ft. 22.5-24 ft.	0.46 1.9 0.2 0.2 0.1

None of the soil samples had mercury concentrations which exceeded the 0.2 mg/L EP Toxicity limit (see Table 2).

Water samples from the monitoring wells have been collected on four separate dates: August 5, September 3 and November 4, 1987, and January 12, 1988. Samples have been submitted to Columbia Analytical Services for mercury analysis. As shown on Table 3, the 0.002 mg/L Primary Drinking Water Maximum Contaminant Level (MCL) has been exceeded in two of the monitoring wells. On August 5, 1987 and January 12 1988, the mercury concentrations in well MW-3 were 0.004 and 0.003 mg/L, respectively. Mercury concentrations in samples from well MW-4 have exceeded the MCL on each of the four sample dates. Concentrations have ranged from 0.012 to 0.039 mg/L, 6 to nearly 20 times the MCL.

Monitoring at the site is currently scheduled to continue until July 1988. Conclusions regarding ground water impacts from past practices will be addressed at the completion of the scheduled monitoring program; however, it is apparent from the data (see

TABLE 2 LABORATORY SOIL QUALITY DATA

EP Toxic	itv Standar	d (mg/L)	=======================================	ሰያ
=======	=========	========	=======================================	=========
			MERCURY CONCE	ENTRATIONS
	Sample	Sample	Total	EPTOX
WELL NO.	Date	Depth(ft)	(mg/kg)	(mg/L)
=======	=========	========	=======================================	========
MW-1	07/20/87	2.5-4	0.1 L	0.0002 L
		5-6.5	0.1 L	0.0002 L
		7.5-9	0.1 L	0.0002 L
	•	10-11.5	0.1 L	0.0002 L
		12.5-14	0.1 L	0.0043
		15-16.5	0.1 L	
		17.5-19		0.0002 L
			0.1 L	0.0002 L
		20-21.5	0.1 L	0.0002 L
MW-2	07/21/87	2.5-4	0.1 L	0.0002 L
		5-6.5	0.1 L	0.0002 L
		7.5-9	0.1 L	0.0002 L
		10-11.5		
		12.5-14	0.46	0.00021
			0.1 L	0.0002 L
		15-16.5		0.0002 L
		17.5-19		0.0002 L
		20-21.5	0.1 L	0.0002 L
K-WM	07/21/87	2.5-4	0.1 L	0.0002 L
		5-6.5	1.9	0.00024
		7.5-9	0.1 L	0.0002 L
		10-11.5	0.1 L	0.0002 L
		12.5-14	0.1 L	0.0002 L
		15-16.5	0.1 L	0.0002 L
	•	17.5-19	0.1 L	
		20-21.5	0.1 L	0.0002 L
		00 01.0	0.1 B	0.0002 Б
MW-4	07/23/87	2.5-4	0.1 L	0.0002 L
		5-6.5	0.2	0.0002 L
		7.5-9	0.2	0.0002 L
		10-11.5	0.1	0.0002 L
		12.5-14	0.1 L	0.0002 L
		15-16.5	0.1 L	
		17.5-19		0.0002 L
		20-21.5	0.1 L	0.0005
			0.1 L	0.0005
		22.5-24	0.1	0.0002 L
		25-26.5	0.1 L	0.0002 L

KEY TO SYMBOLS:

MW = MONITORING WELL L = LESS THAN

TABLE 3
LABORATORY WATER QUALITY DATA

Location	Sample Date	Hg mg/L	На	COND. umhos/cm
MCL		0.002		========
2nd Wate	r Std.	•	6.5-8.5	1600
				=========
MW-1	08/05/87	0.0002 L	6.4	1170
	09/03/87	0.0005 L	7.1	1210
	11/04/87	0.0002 L	7.31	881
	11/04/87	0.0002 L	7.31	881
	11/04/87	0.0002 L	7.31	881
	11/04/87	0.0002 L	7.31	881
	01/12/88	0.0005	7.05	740
MW-2	08/05/87	0.0002 L	6.3	88000
	09/03/87	0.0005 L	6.7	20120
	11/04/87	0.0002 L	6.37	
	11/04/87	0.0002 L	6.37	
	11/04/87	0.0002 L	6.37	
	11/04/87	0.0002	6.37	
	01/12/88	0.002	6.4	63000
MW-3	08/05/87	0.004 E	6.3	490000
	09/03/87	0.0005 L	7.1	91000
	11/04/87	0.0002 L	5.56	13670
	11/04/87	0.0002 L	5.56	13670
	11/04/87	0.0002 L	5.56	13670
	11/04/87	0.0002 L	5.56	13670
	01/12/88	0.003 E	6.2	283800
MW-4	08/05/87	0.039 E	10.4 E	25000
	09/03/87	0.033 E	10.8 E	21360
	11/04/87	. 0.027 E		
	11/04/87	0.031 E		
	11/04/87	0.025 E		
	11/04/87	0.03 E	~ ~ ~ ~	
	01/12/88	0.012 E	10.2	3 638

KEY TO SYMBOLS:

MW = MONITORING WELL

MCL = MAXIMUM CONTAMINANT LEVEL

2nd. Water Std. = Secondary Drinking Water Standard

L = Less Than

E = Exceeds Maximum Contaminant Level

Table 3) that ground water in the site vicinity has bee affected.

APPENDIX A

MONITORING WELL LOGS

BORING LOG

PROJECTweyerhaeuser-Chlor:	INE PLANT Page 1 of _
Location SEE MAP	Boring No. MW-1
Surface Elevation 24.48 Top of Casing	
Total Depth 21.5 feet	Drilled By Mountain States Drilling
Date Completed	Logged By <u>C. Wells</u>

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	SA NO.	MPLE	PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
I N	AATE	0	NO.	TYPE			0-20' <u>SAND</u> , gray, medium grained,	
Chip			1	SSP			<pre>poorly graded, loose, trace silt, occasional fine</pre>	
Bentonite		- 5	2	"			sand zones, saturated below ~10 feet. (FILL).	
Bento	∇	1.0	3	11				
80 PVC		- 10	4	"		_		
Sch. 8		- 15	5	11		SP		
			6	***				
Sand		. 20	7 8	"				
			°					
0 PVC		25						
8 3								
2" Sch. Screen Slots	-						·	

BORING LOG

PROJECT <u>WEYERHAEUSER-CHLORI</u>	NE PLANT Page 1 of 1
Location See map.	Boring No. MW-2
Surface Elevation 18.00 Top of Casing	Drilling Method Hollow Stem Auger
Total Depth 21.5 FEET	Drilled By Mountain States Drilling
Date Completed	Logged By C. Wells

WELL DETAILS	PENE- TRATION TIME/	DEPTH (FEET)	S	AMPLE	PERME-	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
	RATE		NO.	TYPE	TESTING	1		GUALITY
sing		0	1	SSP	·	G.D.	0-9.5' SAND, gray- brown, poorly graded, loose, damp, (FILL).	
			-	35P		SP	·	
Bento		- 5	2	61				
			3	11				
	-	- 10	4	11			9.5-14.5' INTERBEDDED SAND and SILT, dark	
			5	#		SP-ML	gray, slightly to moderately cohesive, nonplastic, many	
क व	;	- 15					organics, saturated.	
Sand			6	11			14.5-20.5' SAND, dark gray, fine to medium	
.010"			7	11		SP	grained, poorly graded, saturated.	
w/0		- 20	8	"				
80 PVC Screen		- 25						
2" Sch.		-		·			·	
						·		

BORING LOG

PROJECT WEYERHAEUSER-CHLORINE PLANT

Page 1 of 1

Location See Map

Surface Elevation 17.84 Top of Casing

Total Depth 21.5 FEET

Boring No. MW-3

Drilling Method Hollow Stem Auger

Drilled By Mountain States Drilling

Logged By C. Wells

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	S/	TYPE	PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
nite————————————————————————————————————		0				SP	0-4.5' SAND, brown, medium grained, poorly graded,	
Benton Ca		- 5	2	SSP "		SP-OL	loose, damp, (FILL). 4.5-7' FINE SANDY SILT, black, organic,	
			3	II.			slightly cohesive, moist (Clarifier Sludge).	
	\\ \\	- 10	4	"			7-17' SAND, gray- dark gray, medium grained, poorly to well graded,	
Sand		- 15	5	"		SW	loose, some gravels and organic material 10-12	
Sa			7	"			feet, saturated below ~10 feet. 17-21.5' SAND, dark	
		- 20	8	11		SP	gray, fine grained, poorly graded, saturated.	
en w/0.01								
Screen		25			į			
80 PVC	}						,	·
" Sch.							·	
2								·

BORING LOG

PROJECTweyerhaeuser-chlor	INE PLANT Page 1 of 1
Location See Map.	Boring No. MW-4
Surface Elevation 26.73 Top of Casing	Drilling Method Hollow Stem Auger
Total Depth 26.5 feet	Drilled By Mountain States Drilling
Date Completed	Logged By <u>C. Wells</u>

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	S/	AMPLE TYPE	PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		0					0-9.5' SAND, brown- gray brown, medium grained, poorly	
X Xit		_	1	SSP		SP	graded, moist, (FILL).	
Ben Casing		- 5	2	"				
			3	11				
		- 10	4	11		SW	9.5-12' SAND, gray brown, medium to coarse grained,	
			5	"			well graded, loose, damp.	
Sand	₹	- 15	6	11		SP	12-20.5' <u>SAND</u> , gray brown, gray, medium grained,	
eres T			7	11			poorly graded, saturated below 15 feet.	
		- 20	8	11			20.5-24' SANDY SILT,	
Slots			9	11		SP-ML	SILTY SAND, very dark gray, black, slightly to moderately	
010		25	10	11		ML	cohesive, some organic material, saturated, (strong petroleum	
80 een w/0.		30					odor?). 24-26.5' SILT, gray, moderately cohesive, trace sand.	
2" Sch. PVC Scr								

APPENDIX B

FIELD DATA FORMS



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

WE LOCATION/ADDRESS	YHUASER - C	LOMINE	Chox		Well or Surface Site Number				
PROJECT NAME					Date, Time //:56 Am 8:5-87				
CLIENT/CONTACT					Weather_0	VERLAST			
						·	·		
(Nearest .01 ft.)		evation Date, Time			Method Used (M-Scope Number or Other)				
			-1	1					
WELL EVACUATION: Gallons	Pore Volumes		Method Üsed	· —	Rinse Metho			, Time Z <i>ZO</i>	
Surface Water Flow Speed		, Measurement Metho		Method			, Date, Time		
SAMPLING: 2	of each	bottle	<u></u>	Depth	Field	<u> </u>		·.	
Date, Sample Time 140-1 8-5 /220	Method	Volume (ml) Soo	Container Type	Taken (feet)	Filtered (yes,no)	Preserva- tive	lced (yes,no)	Sampler Cleaning Method	
<u>"'</u> , <u>"'</u> "	- 	1000	Poly	19'	<u>yes</u> <u>10</u>			Non-Phosphati detergent wasi H2O rinse	
<u>h</u>	· · · · · · · · · · · · · · · · · · ·	<u> 200</u> <u> 200</u> 500	Glass. Poly	19'	No		-, ' <u>'</u> ', -, -, -, -, -, -, -, -, -, -, -, -, -,	MeOH rinse Distilled H2O rinse	
<u>n</u> , <u>te</u> <u>r</u> 1									
FIELD WATER QUALITY I Pore Vol. Number pH	Conductivity 988 U'r	, Tem	p Eh				, ,		
NOTES:			······································						
				· ·					
									
									
					· · ·				
otal # of Bottles:					Signature:_	8 m	يجمس المنظر المعا	SEA-400-0	



Kelso, WA (2 423-3580 Redmond, WA (206) 881-0415

PROJECT		EXELHUMS			Well or Surface Site Number Sample Designation					
	OGY MEASUREME (Nearest .01 ft.)		vation	Date, T	ime	Method Used (M-Scope Number or Other)				
		e Volumes		lethod Used A RASTALT A	·	Rinse Method		Date 8-5	, Time 13 .30	
Surface Wa	ater Flow Speed	·		Measurement N	dethod			Date, Time _		
Sample Sample	Date, Time	Method PEC 15717 L	Volume (ml) 500 700 200	Container Type 130 LY Po LY CLASS PolY	Depth Taken (feet) /9 /9/ /9/ /9/ /9/	Field Filtered (yes.no) YCS, NO, NO, NO, NO, NO, NO, NO, NO, NO	Preserva- tive	_,,	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
Pore Vol. Number		Conductivity	Tem		-,					
GONIA	0ULT,UITY	METER	15	NO 7 OP.	(x A 7 · N (
otal # of Bo	ottles: /0					Signature:_				



Kelso, WA (2 423-3580 Redmond, WA (206) 881-0415

Fold Sampling Data

SEA-400-01

LOCATIO	N/ADDRESS	WEYERAUS	se ci	Well or Surface Site Number Sample Designation					
							8~5~8		5130
							SVERC AS		C 130
				· · · · · · · · · · · · · · · · · · ·					
	OGY MEASUR (Nearest .01 fl		evation	Date, T	ime	Meth	od Used (M-S	Scope Numbe	er or Other)
				.,					-
	ACUATION:				-	<u> </u>			
	illons 2,	Pore Volumes 7. 5		Method Used LISTALTIC	_·	Rinse Metho SAMPLE	·	8-5-67	, Time - /5・3。
Surface W	ater Flow Spec	ed	-1	Measurement	Method			Date, Time _	
SAMPLING	G:						·		
0	Date,		Volume	Container	Depth Taken	Field Filtered	Preserva-	lced	Sampler Cleaning
Sample ールー3	Time	Method 15:30 PELISTAIT:	(ml) ∕ <u>-æo</u> ,	Type Po LY	(feet)	(yes,no) <u>Y <i>C S</i> .</u>	tive	(yes,no)	Method
″	8-5-87	11	130	POLY	 ,	No.		_, _ , ,	Non-Phosphati detergent was
"/		• , — ,	500	GLASS	1,			-, -,	H2O rinse
"	11 1	_,,	200	POLY	·/	NO			MeOH rinse Distilled H2O
 -		<u> </u>	-00	· · · · ·		<u> 10</u> ,			rinse
 •		- , ,			1	NO.			
Number	pH	Conductivity	Tem	p Eh ,	_,			,	
					-	1			
					_,				
OTES:									
ONPULT		NOT	WEEKIN	· c					
OKHA	16 8 0	07 B07	rels	FIEL	ر جر م <u>ن</u>	LTEKEN)		
	· · · · · · · · · · · · · · · · · · ·								
		······································			~				
							,		
								·	
									
									1
otal#ofBo	ottles:	10				Slonature	ani.	a	and s



Kelso, WA (23-3580 Redmond, WA (206) 881-0415

Field Sampling Data

SEA-400-01

		EYLCHUAS		I NOX	Sample Designation 7 w - 4					
PROJECT NAI	ME					Date, Time8-5-87				
						Weather				
HYDROLOGY (Nea	MEASUREMENT (MEASUREMENT)		ration	Date, 7	ime	Method Used (M-Scope Number or Other)				
Gallons	WELL EVACUATION: Gallons Pore Volumes 25、25、1年・53				Rinse Method SAM PLL		Date, Time 8-5-87 - 14'30 Date, Time			
Surface Water f										
1/ 1/ 1/ 1/	QUALITY TEST	, , , , , , , , , , , , , , , , , , ,	Volume (ml)	Container Type PoLY POLY GLASS ADLY	Depth Taken (feet) / 7 // // // // //			(yes,no)	Sampler Cleaning Method Non-Phosphati detergent was H2O rinse MeOH rinse Distilled H2O rinse	
	•			NOT			calo			
otal # of Bottles:	:_/o					Signature:_	Qn	- Ir	ka	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

PROJECT	N/ADDRESS NAME; ONTACT;	160 JNT FRO	Well or Surface Site Number <u>Mひ・</u> / Sample Designation <u>むエーターヌーC</u> Date, Time <u>タースータテー / 430</u> Weather Suny							
	OGY MEASUREI (Nearest .01 ft.)	MENTS: /0 Ele	.83 ft evation	below Date, T	Casing ime 0	Method Used (M-Scope Number or Other)				
Ga	ACUATION:	Pore Volumes 3	Method Used perishitic purp			Rinse Method		13/87 Date, Time		
Surface Wa	ater Flow Speed			Measurement	Method			ate, Time _		
Sample Sample	Date, Time 9/2/47-	Method per:sh.Hic,	Volume (ml) 500 /400	Container Type	Depth Taken (feet) /s/,	Field Filtered (yes,no)	Preserva- live NaOH	ced (yes,no) 	Sampler Cleaning Method Non-Phosphati detergent wasi H2O rinse MeOH rinse Distilled H2O rinse	
Pore Vol. Number	pH 7.72, 7.34,	Conductivity 2.200	Temp /5.	p Eh Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z						
NOTES:			· • · · · · · · · · · · · · · · · · · ·	-						
		1.3-j.l Clean		<u>k</u>						
otal # of Bo	ottles:3					Signature	SI Hensi	lan	·	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDRESS	ut urox	01	Well or Surface Site Number <u>MW-Z</u> Sample Designation <u>WI-9-3-B</u> Date, Time 9/3/87 1401					
CLIENT/CONTACT Ken Johns	٥~			Method Used (M-Scope Number or Other)				
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.)	0.75 Lelo Elevation	Date, T						
WELL EVACUATION: Gallons Pore Volumes 7.5, 3		ethod Used Slabtic prop	-1	Rinse Metho	d , 9/	3/FZDate	, Time 1401 -	
Surface Water Flow Speed		Measurement M	dethod		, D:	ate, Time _	1710	
SAMPLING:								
Date, Sample Time Method 9/3/17 1420 gunp	Volume (ml)	Container Type poly pely	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive H NO3 NG OH	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
FIELD WATER QUALITY TESTS:	,,					-1		
Pore Vol. Number pH Conductivi	ty Temp /\$.	<u>'</u> ,	-,	,				
NOTES:							<u></u>	
poce usl. = 1.5	ial							
water color = clear								
water odor = sight								
cond. too high	to clas) with	meter					
Filto " metals"	sampl	e ,~	/4.6					
			 					
otal # of Bottles:				Signature:	SP Hen	de	•	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDRESS PROJECT NAME	INTEROX Y JOHNSON	Well or Surface Site Number Mルー3 Sample Designation ルエーターラー Date, Time ターン・ゲラ Weather SUNNY						
HYDROLOGY MEASUREMENTS: 9,6 Z (Nearest .01 ft.) Elevation		feet below Daja Ijn	feel below caring Daje Ijme 9/3/9/		Method Used (M-Scope Number or Other)			
WELL EVACUATION: Gailons Pore Vo. 7.5,		Method Used	~ _	Rinse Method	<u> </u>	Date アナー	, Time 1450 - 152	
Surface Water Flow Speed		Measurement Me	thod		, Da	ate, Time _		
	Volume ethod (ml) w.s.h.hik 500 2000, 250	Container Type foly pely	Depth Taken (feet),	Field Filtered (yes,no)	Preserva- tive	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
FIELD WATER QUALITY TESTS: Pore Vol. Number pH Con	ductivity Temp	Eh				,		
NOTES: Pare vol. = 1.55 water color - Clean cond tous		esule co	c de 1,	<u>/y</u>				
Filter "ne	hls" sample	, no /66	5					
otal # of Bottles:				_ Signature;_	I Alex	sha	SEA-400-01	



Total # of Bottles:

Sweet, Edwards & Associates, Inc.

Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDRESS PROJECT NAME		18807 # SALO	6.01	Well or Surf Sample Des Date, Time_ Weather	ace Site Numb signation	9/3/83	: - A
HYDROLOGY MEASU (Nearest .01	•	evation Date, 1 9/3/87	Method Used (M-Scope Number or Other				
WELL EVACUATION: Gallons 20 18,	Pore Volumes	Method Used		Rinse Metho		Date 3-37	;, Time // 00 ~ / 222
Surface Water Flow Sp	eed	, Measurement	Method		, D	ate, Time _	
SAMPLING: Date, Sample Time	Method , pur: 3ta/ti/(Volume Container (ml) Type 500 Poly 1000 Poly	Depth Taken (feet) _/ff	Field Filtered (yes,no)	Preserva- tive HNO 3 NG O H	ced (yes,no)	Sampler Cleaning Method Non-Phosphati detergent was H2O rinse MeOH rinse Distilled H2O rinse
FIELD WATER QUALIT Pore Vol. Number pH 2 , 10.52 3 46 , 11.35	Conductivity	Temp °ζ Eh		,,,,,,,,,,,			
NOTES:							
fore vol.	•					· · · · · · · · · · · · · · · · · · ·	
water colo		brown	 				
							- · · · · · · · · · · · · · · · · · · ·
Filter	metals	sample in 1/	4 b.				
		······································			11	·/	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDF PROJECT NAME CLIENT/CONTAC	WEYE	RNUNSER /	CLORINE	LONG VIEW	T 01.02	Sample Desi		er	1-2-8>	
HYDROLOGY ME (Neares <u>/の・</u> ア3	st .01 ft.)	Ele	vation	Date, T	'ime 	Method Used (M-Scope Number or Other)				
WELL EVACUATIONS		ore Volumes		ethod Used	-1	Rinse Method		Date	, Time	
Surface Water Flo	Surface Water Flow Speed		, Measurement Method			, Date, Time				
	ate, ime	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	iced (yes,no)	Sampler Cleaning Method	
A	18.12		250		C# 11.			YES,	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
	DH 7, 20, , , 27, , , , , , , ,	Conductivity	Temp 14.3							
NOTES: 1.5 GAL DEDICAT	IPV	TURIN	5				,			
						·				
Total # of Bottles: _		4				Signature:	2=		SEA-400-01	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

Field Sampling Data

SEA-400-01

LOCATION/ADDRESS WE'EN!		Well or Surface Site Number						
CLIENT/CONTACT				Weather Overcas 7				
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.)	Elevation	Method Used (M-Scope Number or Other)						
WELL EVACUATION: Gallons Pore Volumes	Me	ethod Used	_,	Rinse Metho	d	Date	, Time	
Surface Water Flow Speed		Measurement	Method		,	ate, Time _		
SAMPLING: Date, Sample Time Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva-	lced (yes,no)	Sampler Cleaning Method	
7-3 / /2:34 B			-10°			, , , , , , , , , , , , , , , , , , ,	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
Pore Vol. Number pH Conductivi		<u> </u>				,		
OTES: ACCURACY OF HIGH SALINITY	CAUSES	MSC	005 /	ر - ، بر سر				
1 ÉMILE FILTER PERICATRO TUBIN'								
otal # of Bottles:	······································		· · · · · · · · · · · · · · · · · · ·	Signature	12an		ind,	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

Field Sampling Data

SEA-400-01

PROJECT	NAME WEY	SR HUASER !	CHIDANE		Well or Surface Site Number					
(1	GY MEASUREM Nearest .01 ft.) 10,38	evation	ime //: 35	Method Used (M-Scope Number or Other)						
Gall	WELL EVACUATION: Gallons Pore Volumes 3 Surface Water Flow Speed					Rinse Method		Date, Time		
Surface Wa			· ·							
Sample	Date, Time		1			Field Filtered (yes,no)	Preserva- tive	ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse	
Pore Vol. Number	pH <u>£,49</u> <u>5,53</u> <u>5.56</u>	Conductivity 13,760 13,760	Temp 19.7 19.9 19.9		-,,,		· · · · · · · · · · · · · · · · · · ·			
	CALS /	P. V TURNAG					·			
Fotal # of Bo	olities:	<i>د</i> /				Signature	12-	2	Prud.	



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDRESS WEYERNUASER /LONGUILLE							Well or Surface Site Number 1964 Sample Designation 1972					
PROJECT	TNAME WEYE				. 0 2	Date, Time 1/4-87 Weather 2060 ACC						
CLIENT/C	CONTACT		· · · · ·									
HYDROLOGY MEASUREMENTS: (Nearest .01 ft.) Elevation Date, Time 15-3-3 //- V-8 >							Method Used (M-Scope Number or Other)					
	WELL EVACUATION: Gallons Pore Volumes 4				Rinse Method							
Surface W	ater Flow Speed						······································					
SAMPLING	G:			 								
Sample 1-2 A	Date, Time	Method P Pump	Volume (ml) 250,	Container Type PoLY	Depth Taken (feet)	Field Filtered (yes,no)		ced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse			
FIELD WAT	TER QUALITY TE	STS:			···							
Pore Vol. Number	pH //50	Conductivity	Tem, /.3,5		• OFF	SCA .	C.E.,					
OTES:						· · · · · · · · · · · · · · · · · · ·						
/ = 5) 5 : F	<u>.</u>			-,							
PH	\$ CO110	UET, VIT V		FFZ		AR luu	CONOU	et Ed				
TEST.	S					70 0.20		7 76				
olo	PICATED	TUBIM	<u>-</u>									
· · · · · · · · · · · · · · · · · · ·			.									
					,							
otal # of Bo	ottles:	4				Signature	1.		.1			



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

LOCATION/ADDRESS _ PROJECT NAME <u>WEY</u> CLIENT/CONTACT			# 54/.0,	1.02	Sample Des Date, Time_		~- 5	isk Ein
HYDROLOGY MEASURE (Nearest .01 ft.)		evation	Method Used (M-Scope Number or Other)					
WELL EVACUATION: Gallons	Pore Volumes		lethod Used	-1	Rinse Metho	d		, Time
Surface Water Flow Speed	1	·	Measurement	-, Method		, D		
SAMPLING: Date, Sample Time	Method Pilare	Volume (ml)	Container Type PO1 P	Depth Taken (feet)	Field Filtered (yes,no)	Preserva- tive	lced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse
								MeOH rinse Distilled H2O rinse
Number pH	Conductivity	Temp	Eh	-,				
NOTES:								
TRANSFER A - PA	EK-N-	LIAP)	e pr	57,480	11-11-87	Ca l	Purcy	1580
	-		·····	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	··	
otal # of Bottles:					Signature;_	6		SEA-400-01
								~~~~~UU~UI



Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

## Feld Sampling Data

SEA-400-01

	_	UEXECO	Sample Des	ace Site Numb ignation	W-1 /4	1-1 84.7			
PROJECT NAME #							1-12-88		
	*IACI				<del></del>	Weather	OVERCA	<i>s</i> 7	
	Y MEASUREM	IENTS:				<del></del>	· · · · · · · · · · · · · · · · · · ·		
(Ne	earest .01 ft.) 8.79		levation	Date, Time Method Used (M-Scope			cope Numbe	er or Other)	
8.79				70.30	m Sce	<u> </u>			
WELL EVAC	IATION:								
WELL EVACU		ore Volumes	м	lethod Used		Rinse Metho	d	Data	Time
6	_, <u>~</u>		<b>a</b> .				J-12 33		
Surface Wate	r Flow Speed			Measurement I			,	ate Time	
SAMPLING:				······································					
OAMF LING.					Depth	Field			
	Date,		Volume	Container	Taken	Filtered	Preserva-	Iced	Sampler Cleaning
Sample	Time -12 <del>SS</del> 110⊃	Method	(ml)	Туре	(feet)	(yes,no)	tive	(yes,no)	Method
<i>-121</i> /,	" " "	P Puro	500	POLY,		VE5.		, <u>A</u> C.	Non-Phospha
		•						-,,	detergent was H2O rinse
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									Distilled H2( rinse
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Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

PROJECT	N/ADDRESS	Well or Surface Site Number  Sample Designation							
	OGY MEASUREMI (Nearest .01 ft.) 7. 26	Ele	evation	Date, T	me Method Used (M-Scope Number or Other				
	ACUATION: Ilons Po	re Volumes		Method Used		Rinse Method		Date, Time	
Surface W	Surface Water Flow Speed						, D _i	Date, Time	
Sample Sample  v-4/w-Z,	Date, Time /3 05 / /58	Method	Volume (ml)	Container Type	Depth Taken (feet),	Field Filtered (yes,no)	Preserva- tive	lced (yes,no)	Sampler Cleaning Method Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
FIELD WAT Pore Vol. Number	pH 457, 6,71	Conductivity	Temp /2.7 /2.5		-,			,	
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Total # of Bo	ottles:					Signature:_			SFA-400~01



# Field Sampling Data

SEA-400-01

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CLIENT/CC	ONTACT					Weather	oun cas	+			
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WELL EVA	CUATION:			•		<del></del>					
	Gailons Pore Volumes 23 Surface Water Flow Speed		lethod Used		Rinse Method		Date, Time /-/2-28				
Surface Wat			·· ——	, Measurement Method		•	,	ate Time			
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Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

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(Nearest .01 /4, /9	ime 1130	Meth	od Used (M-S	Scope Numbe	er or Other)					
	<u> 730</u>									
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Surface Water Flow Sp	eed	· — · · · · · · · · · · · · · · · · · ·	Measurement I	Method		Ample Designation Mu -2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2				
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Sample Time	Method	(mf)	Type	(feet)				Cleaning Method		
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<u>w2</u> 1:03				<del></del> )	<u> 775,</u>	700	-,,	detergent wash		
,						<del></del>	<u> </u>	MeOH rinse		
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# Sweet, Egyards & Associates, Inc.

Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

# Field Sampling Data

SEA-400-01

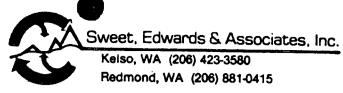
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urface Water Flow Sp			Measurement I	Method	-	,	ate, Time	
AMPLING:								
Date, ample Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)		ced (yes,no)  -,,	Sampler Cleaning Method Non-Phospha detergent wa H2O rinse MeOH rinse
LD WATER QUALIT	Y TESTS:		,			<u> </u>	-,,	Distilled H2 rinse
ELD WATER QUALIT ore Vol. umber pH			Eh		,	· · · · · · · · · · · · · · · · · · ·	-,,	Distilled H2
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### APPENDIX C

CHAIN OF CUSTODY FORMS

# Sweet, Edwards & Associates, Inc. Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

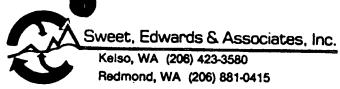
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ADDRESS				SAN		TILE			BON	필	/s	1											CONTAINERS
TELEPHONEN 425-2150				8	NICS 40	VOLA 8010		8310	CAR	HAL	ETAL	-	_										DNTA
SAMPLERS NAME Com We SAMPLERS SIGNATURE	11,5	PHONER 423-	3 580	1/ACI	0RGA	9 5 9 5 9 5	<b>(</b> 0	E. 9	9360	SAIC O	<b>X</b>	OTAL Trist	S			₩.						į	ت ا <b>خ</b>
SAMPLERS SIGNATURE	78	wells		/NEL	TILE 1S/62	GEN/ NICS	07 O	NUCL	080 415/	90%	) X	LS (T	ORG/	QNO	02. C	Mg. Na.							NUMBER OF
SAMPLE I.D. DATE	TIME	LAB 1.D.	TYPE	BASE 6C/N	VOLATILE ORGANICS GC/MS/624/8240	HALO	PHEN 604/8	POLYNUCLEAR AROMATIC 6:0/8310	TOTAL ORGANIC CARBON (TOC) 415/9360	TOT X	EP 10	METALS (TOTAL) (See Special Inst.)	10.P	pH, COND	NO3/NO2. CI SO4	<b>≱</b>							
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2. MW-2-2A 7-21			tı								×												
3. MW-2-3 A 1			13								×	×											
1. A 4 -2-4 M			/1								X	×				•							
5.MW-2-5A 11			11								X	×			<del> </del>								
6. MW-2-6 A 11			h								X	×											
1.mw-2-7 A "			11								×	×	1										
BMW-2-8 A 11			ŧ.								×	X	×							-			
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PROJECT Weyerha					ANA	LYSIS	REQUE	STED								AL CH	EMIST				ОТН			-
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SAMPLERS SIGNATURE	ion	12	PHONE # 23-3		NEL S/6	TILE S/6	SEN/	200	ATCL	9RC 415/	905	9 ×	S CI	ORG/	QN.	02. (	J. Na.							NUMBER OF CONTAINERS
SAMPLE I.D.	DATE	TIME	LAB 1.D.	TYPE	BASE GC/M	VOLATILE ORGANICS GC/MS/624/8240	HALO	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX ) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	PH. COND	NO3/NO2. CI SO4	Ca. Mg.							Ž(
1.MW-3-1 A	7-21			Soil								X	X											
2.MW-3-2 A	11			/1								X	X											
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8. MW-3-8 A	11			//								X	X											
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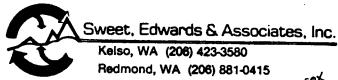
# Sweet, Edwards & Associates, Inc. Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

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# Chain of Custody/ Laboratory Analysis Request NATE July 24,87 PAGE 2 OF 2

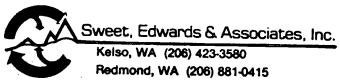
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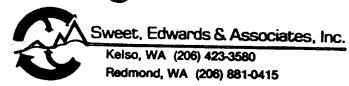
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# Sweet, Edwards & Associates, Inc. Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

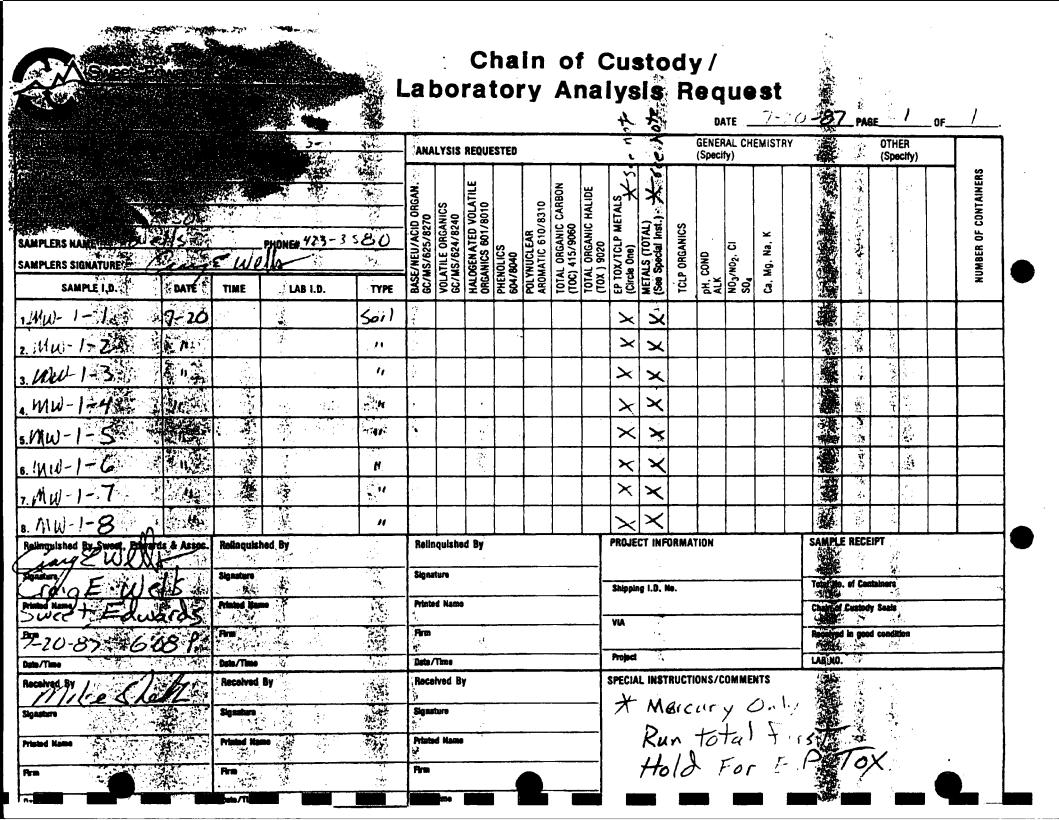
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# Sweet, Edwards & Associates, Inc. Kelso, WA (206) 423-3580 Redmond, WA (208) 881-0415

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State of Washington Department of Ecology

### REQUEST FOR ANALYSIS

MANCHESTER ENVIRONMENTAL LABORATORY

LOCATION Chlor-	ur, Longvier RE Alkali Plant			
REPORT DATA TO MIC	chael Spener 438-3016		LAB USE ONL	1
DATES: SAMPLING: _ 6/16		LAB	APPROVAL BY AMOUNT	Jool
DATES: SAMPLING:	TO LAB:T	РРП	JECT CODE	
☐ EMERGENCY ☐ CU	STODY CLASS II	FKB	JEC1 CODE	
MATRIX: WATER S	IIL   SLUDGE   BTHER	LAB	NUMBERS	
OTHER				
UIHER				
PHYSICAL & INDRGANIC	C,N,P,BIOL & METALS		ORGANICS, TOXICS	
Sar	# nples	Samples		Sample:
Turbidity	BOD/5 Day		Base/Neutrals/Acids	
рН	COD Chem Oxygen Demand		Base/Neutrals Only	ļ
Conductivity	TOC Total Org Carbon		Acids Only	
Total Alkalinity			Volatile Organics	
Acidity	NUTS (4)		Pesticide/PCB's	ļ
Hardness, Total	Ammonia		PCB's Unly	ļ
Chloride	Nitrate-Nitrite		Purgeable Halocarbons	
Fluoride, Total	Total Phosphate		Herbicides	ļ
Sulfate	Ortho-Phosphate			1
Cyanide, Total				<u> </u>
Color			Poly. Aromatic Hydrocarbons	<u> </u>
Salinity	Fecal Coliform Bacteria		Hydrocarbon Analysis	
	Fish Bloassay		Phenolics (AAP)	ļ
			Oil & Grease	<u> </u>
SOLIDS (4)	Priority Pollutant Metals		Ignitability	<u> </u>
TSS Tot Susp Solids	EP TOX Metals		Halogenated Hydrocarbons	1
TS Total Solids	METALS (list) Total Diss.		TOX	
	Total Mercury	10	% Solids	
TVSS Volatile Solids	9		% Lipids	<u> </u>
TVSS Volatile Solids SS Settleable Solids			II.	
		<b></b>	<u> </u>	
SS Settleable Solids				

SAMPLE DISPOSITION AFTER ANALYSIS ECY 040-2-62 Rev. 10/86

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(30) Metals - Specified

(WE) DOE, Manchester (DOE-357L)

Was

i: WEYERHAUSER, LONGVIEW

: Mercury Hg-Sedmt mg/kg-wt

(Par# 71920 S)

Instrument: ACF403 AA Cold Flame (PE403) Method: EP1-245.5 Mercury, Cold Vapor, Manual, Sediments

Chemist: (MMM) McIntosh, Myrna LAB Hours Worked:

Lab Prep: ( ) Unspecifed

Date Preprd:

Date Anlyzd: 870812

Matrix: (40) Sediment

Units: (24) mg/kg-wt

ine	Sample #	Result	Sample Location/Description	#Days to Anl
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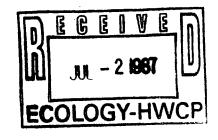


#### Weyerhaeuser Paper Company

Longview, Washington 98632 (206) 425-2150

June 29, 1987

Michael Spencer Hazardous Waste Clean-up Program Washington Department of Ecology MS PV-11 Olympia, WA 98504-8711



Dear Michael:

Re. Chlor-Alkali Plant Mercury Investigation

Enclosed is a copy of the strategy our consulting engineers, Sweet, Edwards and Associates, would intend to follow in siting the four shallow groundwater monitoring wells in the area west of the Chlor-Alkali plant. Following your review, please let me know of any concerns you might have with this approach. We are intending to have these wells installed in mid-July.

Sincerely,

Ken Johnson

Region Environmental Engr.

KJ:ph



#### Sweet, Edwards & Associates, Inc.

Ground Water, Waste Management, Engineering Geology & Drilling Services

506 Royal Street West • Kelso, WA 98626-3409 • (206) 423-3580

June 23, 1987

Ken Johnson Regional Environmental Engineer Weyerhaeuser Paper Company Longview, WA 98632

RE: MONITORING WELLS AT THE WEYERHAEUSER CHLORINE PLANT

Dear Ken:

We propose to install four shallow monitoring wells near the west side of the Longview chlorine plant. Previous investigations by Weyerhaeuser have shown that there are low part per million concentrations of mercury in the shallow soils near the salt storage pile west of the plant. The purpose of these monitoring wells is to determine if there is mercury contamination in shallow ground water near the western area of the plant site.

The four monitoring wells will be installed in two steps. The first step will be to determine ground water flow direction in the vicinity of the salt storage pile. This will be done by installing three shallow monitoring wells at the locations shown on the attached figure. Hydrology measuring points will also be established on the Columbia River and CDID ditch #3.

Following installation of the initial three monitoring wells, the measuring point elevations of these three wells will be surveyed. Hydrology measurements from the initial three wells, the river, and ditch #3 will be used to determine ground water flow direction and to thereby locate an additional downgradient monitoring well. Ground water studies at other Longview area idustrial sites have shown that the CDID ditches generally control shallow ground water flow direction. For this reason, ground water flow direction in the vicinity of the chlorine plant may be towards or away from the Columbia River.

The four monitoring wells will be installed using Sweet-Edwards' QA/QC drilling methods and field procedures. The wells will be drilled with a hollow stem auger drilling machine. During drilling, soil samples will be taken at minimum 3-foot intervals, with the samples split in the field. One set of soil samples will be submitted for determination of total mercury content, and the second set of samples held for later laboratory testing if needed.

Redmond, WA • San Jose, CA • Glendale, CA

Johnson June 23, 1987 Page 2

downhole drilling and sampling equipment will be steam cleaned between boreholes and soil samples to prevent cross contamination. Soil samples will be preserved and stored prior to laboratory testing according to the requirements of EPA SW-846.

The monitoring wells will be constructed of rigid PVC casing and screen with threaded joints and machined-screen slots. The wells will be completed with a locking steel security casing set in a concrete base. The wells will be drilled and constructed according to the requirements of WAC 173-160.

Following installation of the fourth monitoring well, the screens will be developed using pumping and surging techniques. wells will then be sampled every other month for one year and the ground water samples tested for total mercury. Sweet-Edwards' QA/QC field procedures for ground water sampling and chain of custody will be followed. Sweet-Edwards' field procedures for monitoring well installation and ground water sampling have been audited by the Washington DOE and Region X EPA.

If you have any questions regarding this proposal, please call.

Respectfully submitted,

In E. Elwant

SWEET, EDWARDS & ASSOCIATES, INC.

JOHN E. EDWARDS

Vice President

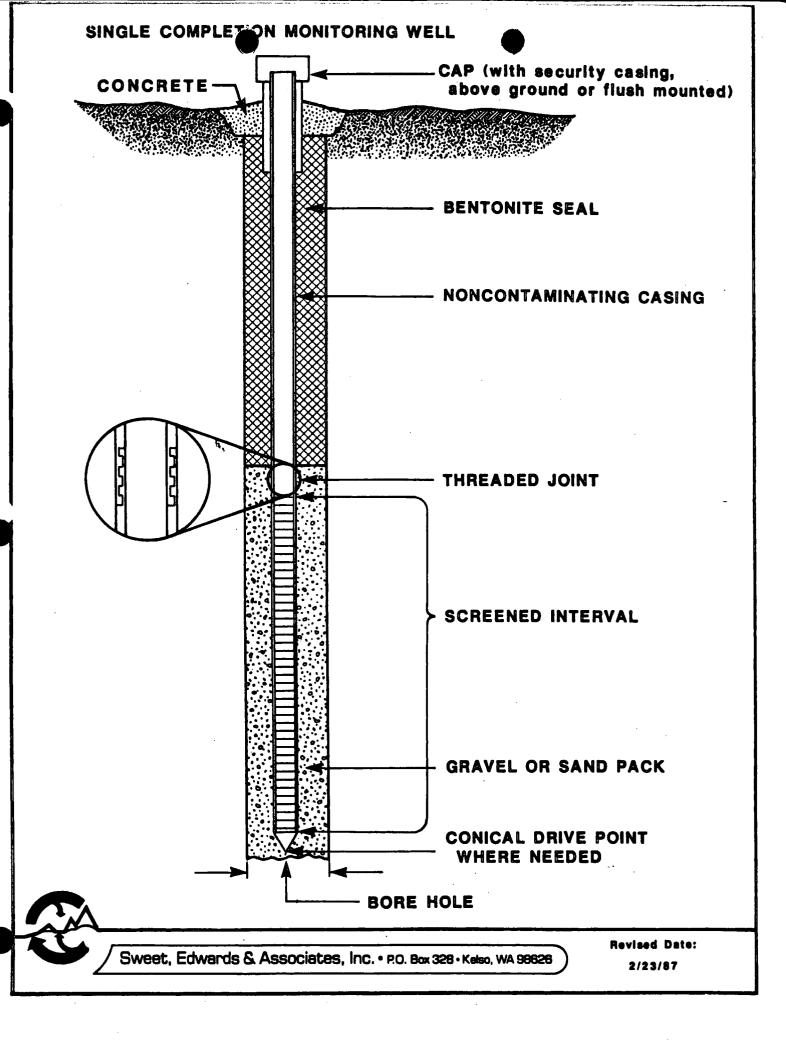
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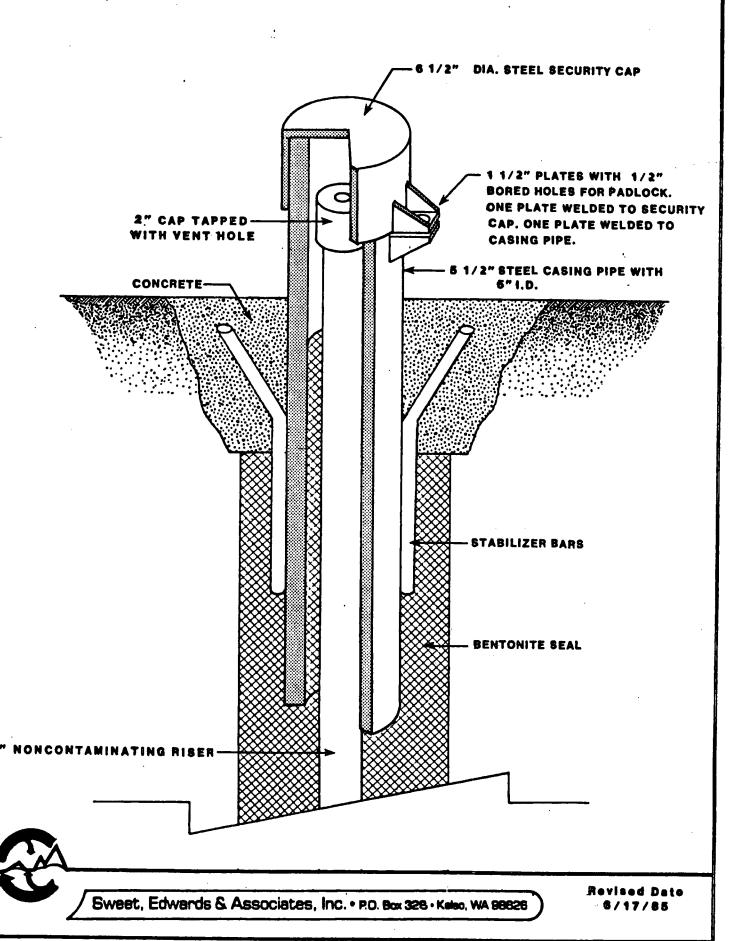
Monitoring Well

Security Casing Diagram

Field Data Sheet Chain of Custody



### MON-ORING WELL SECURITY CASING





### Sweet, Edwards & Associates, Inc.

Kelso, WA (206) 423-3580 Redmond, WA (206) 881-0415

# Field Sampling Data

LOCATION	MADDRESS			Sample Designation									
				Date, Time									
HYDROLO	GY MEASUREN	IENTS:	<u> </u>					···					
<u> </u>	Nearest .01 ft.)		evation	Date, Ti	me 		od Used (M-Sc		r or Other)				
			· · · · · · · · · · · · · · · · · · ·	·	1				,				
	ICUATION:	ore Volumes		lethod Used	-,	Rinse Metho			, Time				
Surface Wa	ater Flow Speed		•	Measurement N	., Method								
SAMPLING	3:	1"				·							
Sample	Date, Time	Method	Volume (mi)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preserva-	lced (yes,no)	Sampler Cleaning Method				
		.,	1						Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O				
		-11	,		1	· · · · · · · · · · · · · · · · · · ·		-1,	rinse				
FIELD WA	TER QUALITY T	ESTS:											
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#### STATE OF WASHINGTON

#### DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

May 27, 1987

Mr. Ken Johnson Region Environmental Engineer Weyerhaeuser Paper Company Longview, WA 98632

Dear Mr. Johnson:

Thank you for the opportunity to review Weyerhaeuser Company's work plan for obtaining supplemental mercury residuals information at the site of the former Longview Chloralkali Plant. My comments and further recommendations are:

- 1. As discussed on the telephone with you last week, I also believe it is preferable to locate one of the downslope monitoring wells further to the west of the boat launch road. However, following discussions with Mike Gallagher, Ecology Hydrogeologist, it is recommended that this be an additional well, with the two downslope wells shown in your figure remaining as shown. This would give a much more comprehensive monitoring of any possible ground water contamination, or absence thereof, and should not significantly increase total costs.
- 2. During construction of these three downslope wells, it would be advisable to collect soil samples at two to three foot intervals and archive for possible future analysis if the ground water study indicates above background levels of mercury. This would provide easily obtainable information regarding depth profiles of any contamination. These should be stored at 4°C at least, or preferably frozen.
- 3. I believe six bimonthly sample collections carried out over a period of twelve months would characterize seasonal ground water fluctuations more comprehensively than at monthly intervals for six months as you propose. This should not alter the study total costs.
- 4. With regards to the upslope well, what assurances do you have that the area selected is free from any previous contamination events?
- 5. I believe it would be appropriate for me to observe the collection of soil samples from the east site area, and be provided opportunity to obtain sample splits for possible analysis by our Ecology laboratory.

Mr. Ken Johnson May 27, 1987 Page 2

6. I feel it would be in both our interests for Ecology to receive interim data on the ground water assessment routinely as soon as available, rather than on request.

I believe I have covered all the points of concern raised through my review of your work plan. Weyerhaeuser is to be complimented for their initiative in presenting this proposal in such a timely manner. Once your implementation schedule is revised to reflect the inexplicable delay in my obtaining a copy of this for review, I shall endeavor punctuality on my part to ensure that this study shall proceed in a timely manner.

Please call me at (206) 438-3016 if you have any questions concerning these comments and recommendations.

Sincerely,

Michael J. Spencer

Hazardous Waste Cleanup Program

MJS:ra

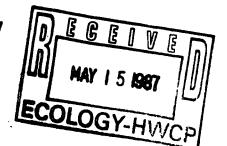
cc: Emily Ray, Ecology Bob Kievit, EPA WOO



#### Weyerhaeuser Paper Company

Longview, Washington 98632 (206) 425-2150

April 14, 1987



Michael Spencer Hazardous Waste Programs Washington Department of Ecology MS PV-11 Olympia, WA 98504

Dear Mr. Spencer:

Attached is a work plan which intends to address the additional information needs identified in your February 16 site inspection report on Weyerhaeuser Company's Longview Chlor--Alkali plant. With your approval, we are prepared to implement this plan immediately.

If your review of the plan results in any questions, please feel free to contact myself or Jim Fisher (ph. 924-6825).

Ken Johnson

Region Environmental Engr.

KJ:ph

# A Proposed Study Plan Supplemental Mercury Residuals Information Longview Weyerhaeuser Chloralkali Plant

#### Introduction

On February 16, 1987, the Weyerhaeuser Company received from the Washington Department of Ecology (WDOE) a copy of their Site Inspectic Report, which describes the WDOE and Region X EPA decision and recommendations concerning the residual mercury contamination issue at the Weyerhaeuser Company's Longview Chloralkali plant. The results of the report stated that there was no apparent impact on the various environments surrounding the plantsite, and that planned industrial development in the area west of the facility would be allowed to go forward. However, there were some requests for additional information and site characterization before the WDOE would recommend the site for removal from the CERCLIS list of active hazardous waste sites, and place it on the EPA list of sites requiring no further action.

The additional study requirements included: groundwater monitoring in the vicinity of the designated "west site"; notification of the potential safety implications of the residual mercury contamination in the surficial soils at the west site to any construction crews; noting the presence of the residual mercury at the west site in the property deed; and performing more detailed characterization of the mercury residual potential at the designated "east site".

The following describes a proposed plan for providing the supplemental information required by the WDDE.

Approach/Experimental Design

1. Groundwater Monitoring at the West Site

A. Well Installation

Install three (3) groundwater wells in the vicinity of the designated "west site" area of the chloralkali plant to sample the surficial aquifer that occurs at approximately 10-15 feet in depth. Specifically:

- a. Two wells will be driven approximately midway between the pararea at the west site and the Columbia River, along the corridor between the pulp mill effluent pipes and the boat launch.
- b. One well for assessing background conditions will be driven upslope approximately 400-500 feet north of the west area, a in a direction perpendicular to, and directly away from the river.

All wells will be screened at approximatley 12 to 15 feet depths and will be of appropriate materials and specifications to adequately sample the uppermost aquifer for residual mercury in the groundwater.

Chart Stongs

Survey wells.

#### B. Groundwater Assessment Protocol

Samples for total mercury will be collected from each of the three groundwater assessment wells at monthly intervals for six months following their installation. A finding of no significant difference (F<0.1) in sample mercury concentrations between upslope and downslop wells will require no further sampling from the wells, and serve to substantiate that the "west site" is not having an impact on groundward in the area. However, a finding of significant difference (P<0.1) between upslope and downslope well sample mercury values will require monthly sampling for an additional six months to further characterize ambient conditions and well sample differentials.

#### 2. Construction Safety at the West Site

Any future construction plans which may involve the west site ar will include additional safety procedures specific for the potential exposure to residual mercury in the surficial soils in certain areas.

#### 3. Property Deed Notation

A notation on the deed to the property will be recorded that wil in perpetuity notify any potential purchaser that the surficial soils in certain areas of the west site contain elevated residual mercury concentrations.

#### 4. East Site Expanded Assessment

In an effort to further characterize the extent of any residual mercury contamination at the east site area, the following sampling  $\rho$  will be followed:

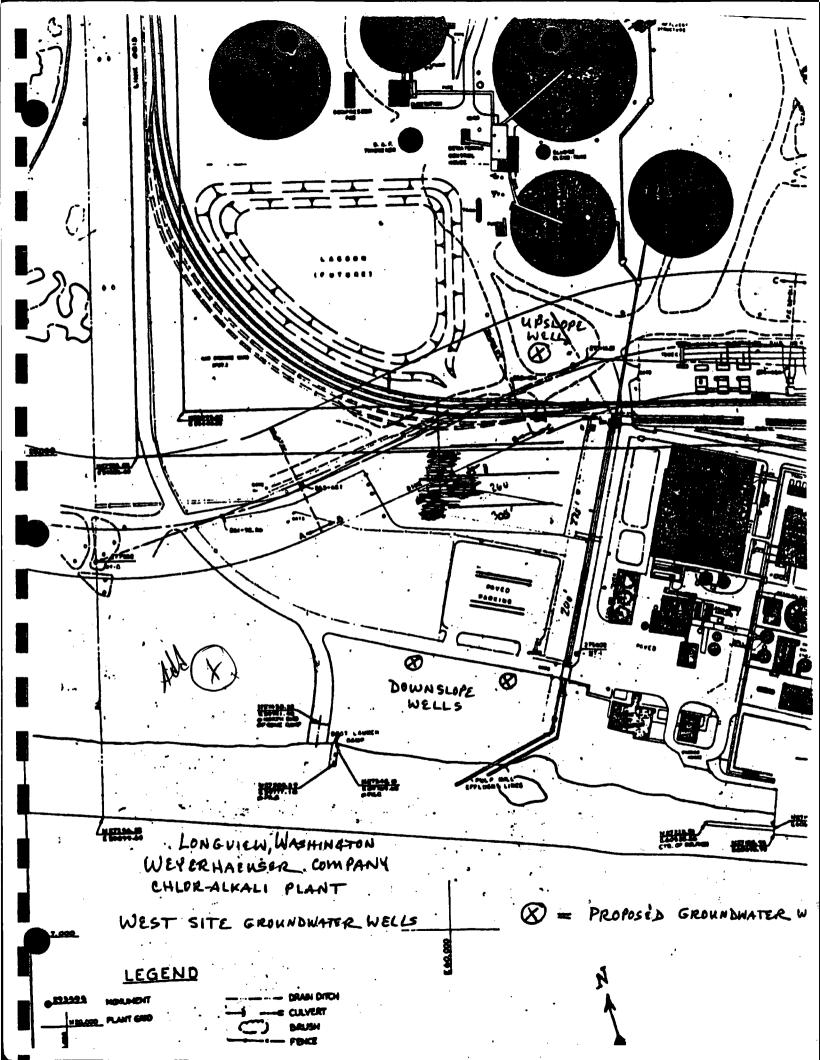
- A. Per the attached drawing of the east site (and associated aer phota circa 1970), depth-integrated soil samples will be collected at Sevenlocations, which coincide with the sites of the former brine ponc The brine ponds, of course, were cleaned up per WDOE in the mid-1970 and filled in with clean sand. The site is now a lumber products storage yard.
- B. Samples will be collected via a backhoe from each visually different strata, or at least three depths (1, 5, and 10 feet) if the soil profile is uniform in character.
- C. Samples will also be collected of bottom sediments at two locations along the so-called "caustic storage" ditch, located at the corner of the old chlorine plant cell room building.
- D. All samples will be analyzed for total mercury residuals at t Weyerhaeuser Technology Center Analytical Laboratory in Federal Way, Washington. The WTC is a certified EPA contract laboratory.

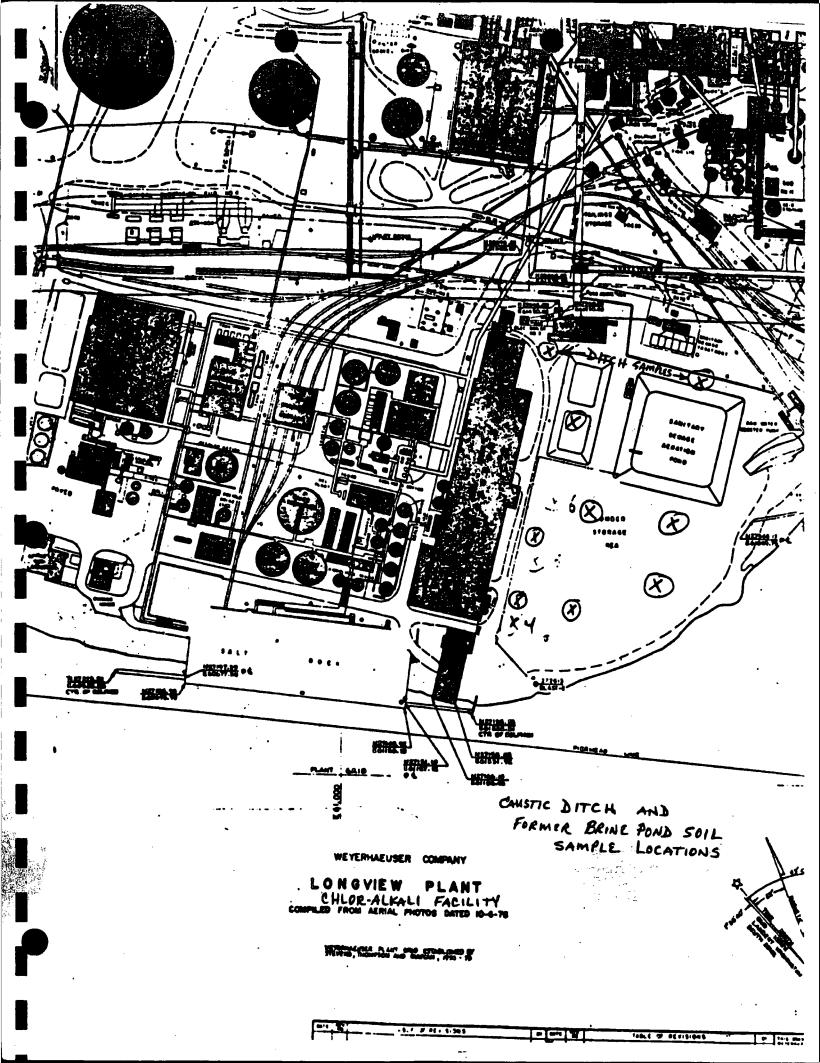
#### Results and Reporting

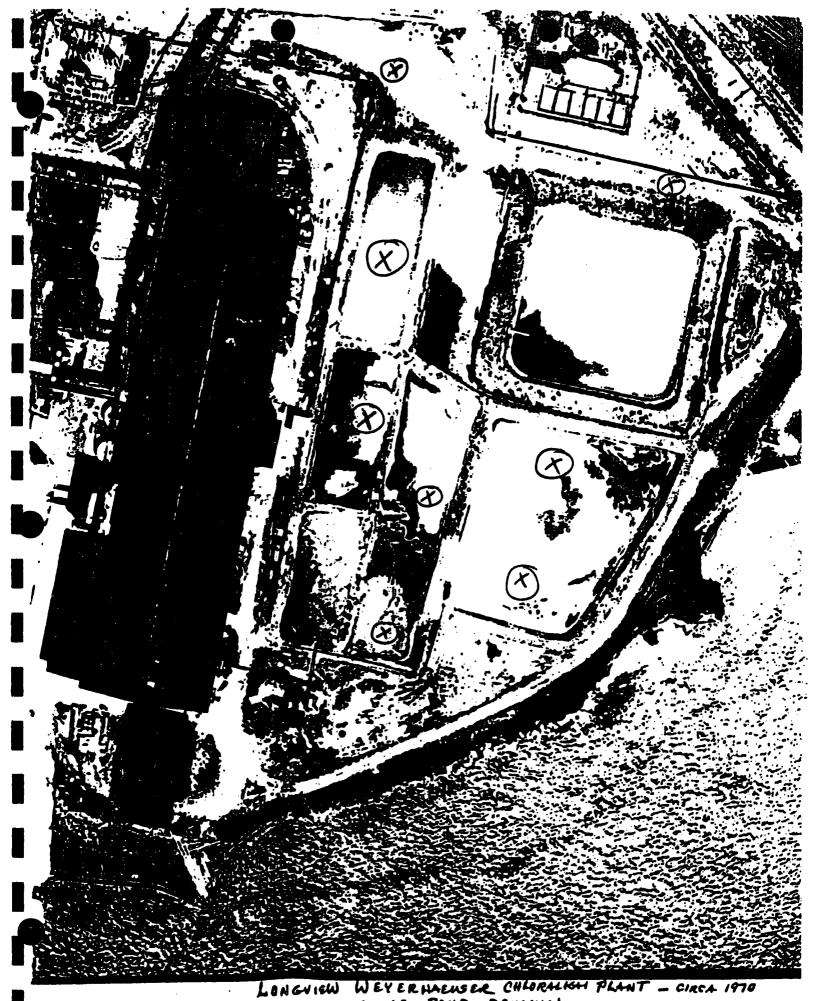
The results of the above studies will be forwarded to the WDOE is two separate reports. The first report will include all items except the groundwater assessment, and will be issued as soon as possible af the east site characterization is completed. This should occur approximately two months after the plan is implemented. The second report will deal specifically with the groundwater study results, and will be completed approximately one month after the final groundwater samples are collected for analyses. Interim data on the groundwater assessment will be available to the WDOE on request.

#### Study Implementation Schedule and Cost Estimation Plan

ITEM	START DATE	END DATE	COST (\$)
Groundwater well	Mid-April	May 1, 1987	5,000
Groundwater sampling & anal.	Early May	Early October	2,500
East site sample collection	(Early May,	Two-days)	1,500
East site sample analyses	Early May	Early June	2,500
Safety Notification	Mid-April		
Property Deed recording	Mid-April		
Reports	1) Late June	(2 Late October	1,000
		Study Total Cos	£ \$12,500







LONGVIEW WEYERHAEUSER CHLORALISH PLANT - CIRCA 19
PRIOR TO BRINE POND REMOVAL.

= PROPOSED SOIL AND DITCH SAMPLING LOCATIONS

#### MATER WELLS WITHIN TWO MILES OF FACILITY

ID	Location (T/R/Sec)	Probable		Installation	Yield		
#U.	(1/4/300)	Aquiler	(feet)	Pate	(gpa)	Owner	Use
						·	**********
1	7 <b>%/2</b> %/8	Alluvium	187	1/54	1,000	Continental Grain Co.	Industrial
2	7H/2H/8	Alluviue	309	1/54	1,000	Continental Grain Co.	Industrial
3	7N/2N/91	Alluvius	215	11/35	500	International Paper Co.	Industrial
4	7N/2N/9	Alluviue	215	11/35	500	International Paper Co.	Industrial
5	7N/2N/9	Alluvius	80	XA	MA	International Paper Co.	Industrial
6	7N/2V/10	Alluvius	291	11/72	60	Longview Boosing Co.	Industrial
7	711/211/9	Alluvius	101	12/74	290	Coulitz County	Industrial
8	7N/2N/6	Alluvius	201	MA	MA	Weyerhauser Timber Co.	and Domestic Industrial
9	7N/2N/6	Alluvius	198	KA	MA	Weyerhauser Timber Co.	Industrial
10	84/24/34	Alluvium	45	1/18/60	150	Westport Chemical Co.	Industrial
11	8H/2H/34	Alluviue	111	12/13/83	703	American Cyanamid Co.	Industrial

MA : Not Available

Source: Reference 3





Photo 1 (above): Location No. 2, sample MJS1 taken at 5 feet depth.

Photo 2 (below): Location No. 4, sample MJS3 taken at 2 feet depth.



Additional Photos 1-8 taken during the split sampling exercise on 6/16/87 by M.J. Spencer.



Photo 3 (above): Gravelly fill from location No. 5.

Photo 4 (below): Location No. 5, sample MJS5 taken at 10 feet depth.





Photo 5(left): Location No. 1 in old brine pond.

Photo 6(below): Location No. 1, sample MJS6 taken at 5 feet depth.





Photo 7(above): Upper ditch, MJS8. Photo 8(below): Lower ditch, MJS9.

